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ABSTRACT

This self-pacing program is the result of a cooperative curriculum development project between The Maryland Department of Education and The Baltimore County Schools. Included is a teachers guide for the use of the materials. The philosophy of this approach is that of individualization of instruction wherein the student moves at a pace commensurate with his ability and background. He studies a topic, either individually or with a small group, then he takes a test measuring mastery of the material. The test is marked "complete" or "incomplete." If he "completes" the topic unit, he proceeds to the next; if not, he does some remedial work until he "completes" the topic unit. It is suggested that written progress reports be kept for each student continuously and that grades for the course be based on number of units completed. The content of this course includes sets, number properties, open sentences, operations with variable expressions, functions, and graphing. Also included is an extensive itemized list of behavioral objectives for each topic, student assignment sheets for each topic, tests and keys for each topic unit. (Author/CT)

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A SELF-PACING PROGRAM IN ALGEBRA, VOLUME I

- A Tentative Guide -

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A Cooperative Project
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and
The Baltimore County Public Schools

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SE 011 311

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The Self-Pacing Program in Algebra which this letter accompanies is the result of a cooperative curriculum development project between the State Department of Education and a local school system. We in the State Department of Education are most anxious to encourage and support such ventures. Cooperation in curriculum development between our staff and that of a local school system, as well as cooperation between local school systems, should have the effect of multiplying our available resources.

One of the serious problems facing educators today is that of rapidly increasing costs to the taxpayer. Shared efforts in curriculum construction which hopefully minimize duplication and maximize quality, may help to hold down these costs. At the same time, when these cooperative projects attain a product which encourages diversity and creativeness rather than conformity, then resources can be made more immediately available to various curriculum areas. It is hoped that the curriculum materials contained herein will measure up to these goals and will serve as one more step toward full and effective progress in mathematics education for Maryland.

Sincerely,

James A. Sensenbaugh

State Superintendent of Schools

FOREWORD

In recent years, there has been increasing interest in the development of mathematics programs which emphasize individualization of instruction. This interest has been generated by a desire to provide each student with the opportunity to use the instructional materials best suited to his needs. Among the programs considered have been a number of efforts involving computer-assisted instruction, programed instruction and self-pacing programs.

Each of the preceding programs, of necessity, requires increased expenditures in time, personnel, materials, and money. Of the programs considered, the self-pacing format offers increased individualization of instruction with minimum expenditures for specialized materials and equipment.

The Office of Mathematics of the Board of Education of Baltimore County, in cooperation with the Maryland State Department of Education has developed A Self-Pacing Program in Algebra. It is hoped that this program will serve as a model for future efforts which use self-pacing techniques and offer suggestions for their implementation.

Any suggestions for improvement of this program would be greatly appreciated. The evaluation sheet is enclosed for this purpose.

Special thanks are offered to Mrs. Carolyn Bruder and Mrs. Linda Tieman for their untiring efforts in typing and reproducing this guide.

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PHILOSOPHY

Educators agree that students learn at different rates. Although curriculum specialists and teachers have attempted to devise programs to meet individual needs in past years, much work remains to achieve the goal of individualized instruction.

There is a definite need for developing a system which provides for individualization of instruction and greater flexibility. Lack of differentiation in the teaching process results in boredom for students for whom the pace is too slow and frustration for those students for whom the pace is too fast. Often this leads to problems of classroom control and high failure rates.

One approach which is attracting attention in educational circles is that of self-pacing programs, wherein the student moves at a pace commensurate with his ability and background. An example of efforts along this line is the Individually Prescribed Instruction program of the Oakleaf Schools in Pittsburgh. In addition, an increasing number of textbook publishers have been influenced by this trend.

Preliminary returns of experimentation and pilot programs indicate that emphasis upon student success results in a more positive attitude by the student toward the subject, teacher, and school environment.

Suggestions for Implementation

The successful implementation of any self-pacing program in mathematics depends upon the cooperation and teamwork of the administration and the teaching staff.

The first administrative concern for the implementation of a self-pacing program of instruction is the construction of the school master schedule. To provide the necessary flexibility for such a program classes should be scheduled in a parallel manner whenever possible. For example, if a school has eight algebra classes, they might be scheduled during the same period of the day or in two blocks of four classes.

Secondly, these classes should be located in adjacent rooms or as near as possible to each other for greater flexibility. Ideally, an additional room should be assigned to the teaching staff during each period to provide extra space for small group instruction, independent study, student-teacher conferences, and testing.

Another feature of scheduling should be the provision of at least one common planning period during the school day for all teachers in the program. This provides the team with opportunities to discuss common problems, evaluate materials, plan daily lessons, regroup students, and develop new materials.

Because of the varied activities occurring simultaneously in any self-pacing program, the teacher should be provided with sufficient paraprofessional help. The possibility of assigning student teachers from nearby colleges to each department member should also be considered. If this is not possible, one or two student teachers might be assigned to the entire department. These college students could then be assigned to the teachers indicating the greatest need on a day-by-day basis. Besides providing a service to the teachers and students, this experience can be immensely valuable to the professional growth of the student teacher. He will have the opportunity to work with and observe more than one experienced teacher, work with small groups before encountering the traditional large class, and develop teaching skills necessary in an informal situation.

A further source of paraprofessional help consists of student volunteers who are advanced in mathematics. Student volunteers can be extremely useful in tutoring individuals within the classroom, correcting tests, and performing other clerical functions.

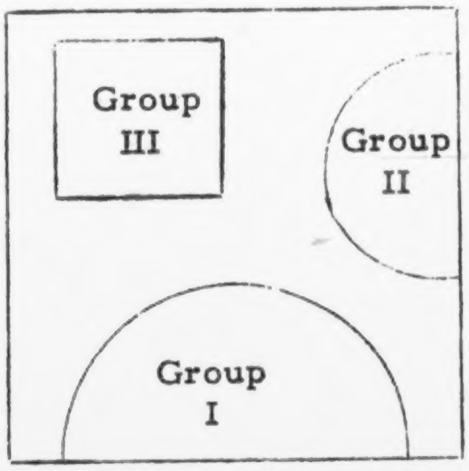
Also, every community contains a nucleus of parents who are eager to serve their community and schools. These people should not be overlooked when searching for additional classroom help.

Part of the role of the teacher in the self-pacing program is to coordinate the activities of the paraprofessional team which might consist of a student teacher, a volunteer student, and a community volunteer.

Class size is an important factor in the effectiveness of a self-pacing program. Thus, the administration should make every effort to reduce class sizes to provide for greater individualization of instruction. Initially, a teacher might be assigned about 20 to 25 students. However, after regrouping has occurred several times, it is possible that one teacher could have a class of 35 students, while a second teacher has only 10.

In the ideal self-pacing program a building might be designed to include large rooms with portable separators. Modular scheduling with several consecutive modules of time devoted to independent study may be a feature of the new curricula. It is hoped that the role of the paraprofessional will be minimized in the ideal situation by assigning several qualified teachers to each class.

It is evident that the role of the teacher will become more complex in the self-pacing program. Each teacher will direct the activities of individual students in two or more groups. This means that more than one activity in the traditional sense must be prepared. The teacher may choose to spend the entire period instructing one group and providing meaningful activities for the other groups. These latter groups can be assigned to paraprofessional aides. A typical situation might find the teacher instructing a group of 12 to 15 students in one part of the room, a student teacher teaching a smaller group of 5 to 7 students in another part of the room or in a different room, and a student volunteer helping individuals in a third place. A suggested arrangement of the room is shown below.



The physical arrangement may change from day to day depending upon the activities planned.

The teacher may wish to spend part of his time working with each group or with individuals. These suggestions in no way exhaust the possibilities for grouping. It may be useful for special purposes to teach the entire section as a whole. No one method should be used exclusively throughout the year. All of the suggested techniques should be considered and others explored.

One of the teacher's main responsibilities is to coordinate the activities of all groups in his class. Daily conferences between the teacher and his team are essential if each group is to have the benefit of planned instruction. Instead of preparing one lesson for the entire class, the teacher is responsible for planning material for each group in his room. Ideally, teachers in a self-pacing program will be provided planning periods for coordination of the team activities in addition to consultation with other members of the professional staff.

Continuous evaluation of student progress should be made. Regrouping within and between classes should be done as frequently as necessary on the basis of the evaluation. In general, no student should be a permanent member of any single group. Individuals should not be placed in groups on the basis of intelligence alone.

The first activity of a self-pacing program should be a diagnostic test. The students can then be assigned to the various sections on the basis of their background. Thus, all students in the program begin at different points.

In order to provide for maximum flexibility, at least two types of grouping should be utilized:

a) intra-class grouping, in which students are grouped within the same section under the same teacher.

b) inter-class grouping, in which students are reassigned to different sections and teachers.

An important feature of intra-class grouping is the flexibility that it provides. In intra-class grouping, students are regrouped daily on the basis of their immediate needs. Intra-class grouping can be accomplished in a variety of ways.

One method provides the opportunity for some students to work independently using student assignment sheets for direction. The remainder of the class can be grouped on the basis of their performance on a drill given at the beginning of the period. The drill should contain material from the past several days' work. Students doing well on the drill can proceed to new material while those who need additional work can be directed to a review group. It is not necessary to record "grades" for these drills, since the drills should be diagnostic in nature.

A second method of daily grouping is to divide the class into two or more groups, depending upon their progress within a given unit.

A third method requires the student to indicate verbally the area in which he needs help. Students having similar difficulties can be grouped accordingly. These possibilities are not intended to be exhaustive.

Inter-class grouping is done less frequently. The basis of this type of grouping is the students performance on periodic evaluations by the professional staff. This evaluation is based on the judgement of the teacher and achievement on unit tests.

The exact technique of regrouping may take several forms. If only a few students in a given class complete the unit successfully, they can move on to the next higher section. Conversely, if only a few do not complete the unit successfully, they may either be re-assigned to a slower group within the class or to a slower section conducted by a different teacher.

The purpose of the achievement test is not to determine a student's grade on the unit. The function of this test is to determine whether the students' background is sufficient to insure success in subsequent units. The level of acceptable performance will vary from unit to unit depending upon the difficulty of the material and its relevance to future concepts. Acceptable scores should be determined for each test by the teaching staff before it is administered. Experience may revise the acceptance levels either upward or downward. A student receives either a "complete" or "incomplete" for the unit and never a numerical or letter grade.

If the student receives a grade of "complete", he moves on to the next unit. If a student's score is "incomplete", the teacher must diagnose the areas of difficulty and prescribe appropriate remedial action. The student may be instructed to restudy the entire unit or merely one or more topics in the unit. When he shows evidence of having completed this prescribed remedial program, he is retested. This retesting may take several forms. The student may take a retest on the entire unit. Therefore, several alternate forms of each unit test should be available. However, a student need not retake the entire test. The students may be tested only on those areas in which a lack of competence was indicated. This test may be written or oral. If the material still is not mastered adequately, the student is again recycled in the remedial process. A student is permitted to progress only when he has earned the grade of "complete". Since it very often happens that a student must restudy a unit several times, a variety of materials other than the text should be available. These should include additional texts, programmed materials, filmstrips, listening posts and recorders, overhead projectors, and remedial materials such as the SRA ALGEBRA KIT and MAST TEACHING.

The mobility of the students in a self-pacing program necessitates a different device for recording student progress than the traditional grade book. A more useful device is a student profile sheet where an entire page is devoted to each student. (See Appendix D.) When student transfers are made, the teachers exchange student profile sheets. The most valuable characteristic of these sheets is that they contain a complete record of the student's academic progress, attendance information, term grades, anecdotal records. They provide a more realistic basis for future placement than the traditional grade.

A sensible method of grading in a self-pacing program is to assign the higher grades to those students who have completed the greatest number of units, while lower grades would be assigned to students completing lesser numbers of units at the end of the term.

The above ideas for implementation of a self-pacing program are merely suggestive and are not intended to be mandatory or exhaustive. Continuous evaluation and refinement of this program can be best accomplished by the participating teachers. Your reactions and comments will prove invaluable for subsequent revision of this effort.

TOPICAL OUTLINE

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

UNIT I SETS, SENTENCES AND THE NUMBER LINE TOPICAL OUTLINE

1. Set membership, one-to-one correspondence, empty set.
2. Subset of a set.
3. Finite and infinite sets.
4. Symbols of equality and inequality.
5. Identification of sentences as equations or inequalities.
6. The number line.
7. Order of operations and symbols of grouping.

UNIT II

VARIABLES

TOPICAL OUTLINE

1. Variables and evaluation of open phrases.

2. Factors, coefficients and exponents.

3. Translation of English phrases and sentences into algebraic phrases and sentences.

1. Axioms of equality.
2. Closure properties of addition and multiplication.
3. Commutative and associative properties of addition and multiplication.
4. Distributive property of multiplication over addition.
5. Addition and multiplication properties of zero.
6. Multiplication property of one.

UNIT IV NEGATIVE NUMBERS TOPICAL OUTLINE

1. Graphs of directed numbers.
2. Order of rational numbers.
3. Additive inverse of a number.
4. Absolute value of a number.
5. Addition, subtraction, multiplication, and division of directed numbers.
6. Product of monomials.
7. Combination of similar terms.

UNIT V OPEN SENTENCES, EQUATIONS AND INEQUALITIES TOPICAL OUTLINE

1. Solution of open sentences by replacement.
2. Solution of open sentences by the addition, subtraction, multiplication and division properties of equality.
3. Solution of equations involving combination of similar terms.
4. Solution of equations involving variables in both members of the equation.
5. Solution of equations involving formulas.
6. Solution of simple inequalities.

UNIT VI

POLYNOMIALS

TOPICAL OUTLINE

1. **Exponent, power, base, coefficient.**
2. **Laws of non-negative integral exponents.**
3. **Addition and subtraction of polynomials.**
4. **Multiplication of polynomials and squares of binomials.**
5. **Division of polynomials.**

UNIT VII SPECIAL PRODUCTS AND FACTORING TOPICAL OUTLINE

1. Factorization of an integer into prime integers.
2. Factorization by removing a common factor.
3. Product of the sum and difference of two numbers.
4. Factorization of the difference of two squares.
5. Square of a binomial and product of two binomials.
6. Factorization of quadratic trinomials.
7. Combinations of several types of factoring.
8. Solution of quadratic equations by factoring.

UNIT VIII FRACTIONS TOPICAL OUTLINE

1. Restrictions on the variable.
2. Reducing fractions.
3. Ratio.
4. Multiplication and division of fractions.
5. Addition and subtraction of fractions.
6. Simplification of complex fractions.
7. Solution of open sentences with fractional coefficients.
8. Solution of fractional equations.

UNIT IX

GRAPHS OF EQUATIONS

1. Open sentences in two variables.
2. Graphs of points in the Cartesian plane.
3. Graphs of linear equations.
    a. chart method
    b. slope y-intercept method
4. Determination of the equation of a line given:
    a. point and slope
    b. slope and y-intercept
    c. two points.
5. Graphs of inequalities in two variables.
6. Solution of simultaneous equations in two variables.
    a. graphic method
    b. addition-subtraction method
    c. substitution method
    d. Cramer's rule

UNIT X

THE REAL NUMBERS

TOPICAL OUTLINE

1. Rational numbers - fractional form, decimal form.
2. Irrational numbers - roots of rational numbers.
3. Properties of irrational numbers.
4. Product and quotient properties of radicals.
5. Addition, subtraction, and multiplication of radicals and quadratic surds.
6. Rationalization of denominators containing radicals and quadratic surds.
7. Solution of open sentences containing radicals.

1. Relations.
2. Functions.
3. Proportion.
4. Direct variation.
5. Inverse variation.

BEHAVIORAL OBJECTIVES

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

UNIT I. Sets, Sentences, and the Number Line

The student should be able to:

1. identify members of a set.
2. list the members of a set described by a rule.
3. write a rule describing a set whose members are given.
4. state whether or not a one-to-one correspondence exists between two sets.
5. identify finite sets, infinite sets, the null set.
6. identify subsets of a given set.
7. list all the subsets of a given set of three or fewer members.
8. state that the null set is a subset of every set and every set is a subset of itself.
9. identify the symbols which represent the null set among the following list:
   a. 0
   b. $\{0\}$
   c. $\{\emptyset\}$
   d. $\emptyset$
   e. $\{\ \}$
10. graph appropriate sets on a number line. These include:
    a. {1, 3, 5}
    b. {all numbers between 3 and 5}
    c. {all numbers between 0 and 1 including 0 and 1}
    d. {all numbers greater than 4}
11. on the number line locate a point associated with a given coordinate.
12. name the coordinate associated with a given point on a number line.
13. decide by computation whether the right and left hand side of a number statement name the same number.
14. place the proper inequality symbol, < or >, between two number statements to make a true inequality.

15. state that if one number is greater than a second, the former's graph is found further to the right than the latter's on a number line.
16. compute correctly the value of a number phrase by using the order of operations rules.

UNIT II. Variables

The student should be able to:

1. identify (and he need not be required to write definitions for the following terms):
   - a. variable.
   - b. replacement set.
   - c. constant.
   - d. factor.
   - e. term.
   - f. coefficient.
   - g. exponent.
   - h. base.
   - i. power.
2. distinguish between factors and terms.
3. state the number of terms in an algebraic expression.
4. write 3 times a as $3a$, $(3)(a)$, $3 \cdot a$.
5. given a phrase such as $\frac{3a}{4}$ write its equivalent, $\frac{3}{4}a$.
6. distinguish between $(2b)^2$ and $2b^2$ by stating to which quantity the exponent refers in each case.
7. evaluate formulas by substituting numbers for variables.
8. write an algebraic expression representing a written phrase such as "five times a number, increased by three".
9. write an algebraic sentence representing a written sentence such as "a number increased by five is twelve".

UNIT III. Non-negative Numbers of Arithmetic and Elementary Structure

The student should be able to:

1. identify the reflexive property of equality, given a statement such as 5 = 5.
2. identify the symmetric property of equality, given a statement such as 5 = 3 + 2 implies 3 + 2 = 5.
3. given a statement such as 3 = 5 - 2 and 5 - 2 = 2 + 1 implies 3 = 2 + 1, identify it as an application of the transitive property of equality.
4. given the first two parts of the transitive property of equality, supply the third statement.
5. state whether or not a given set of numbers is closed with respect to a given operation.
6. given a number sentence illustrating one of the following properties, identify the property:
   a. commutative property for addition or multiplication.
   b. associative property for addition or multiplication.
   c. distributive property for multiplication over addition.
7. identify distinct terms involving one variable as similar or not similar.
8. combine similar terms by addition and subtraction.
9. identify the multiplicative property of 1, i.e. $a \cdot 1 = a$ for all numbers a.
10. identify the additive property of zero, i.e. $a + 0 = a$ for all numbers a.
11. name 1 as the multiplicative identity element.
12. name 0 as the additive identity element.
13. identify the multiplicative property of zero, i.e. $(a)(0) = 0$ for all numbers a.
14. state that $\frac{a}{0}$ names no unique number of arithmetic consequently one cannot divide by zero.
15. state that $\frac{0}{a} = 0$ if $a \neq 0$.

16. given a series of equalities of no more than four members and a list of the names of basic properties of equality and the non-negative numbers of arithmetic, be able to write the reason supporting each step.

Example: Prove $3(a + b) + c = 3a + (c + 3b)$

	Statement		Reason
1.	$3(a + b) + c = (3a + 3b) + c$	1.	______________
2.	$(3a + 3b) + c = 3a + (3b + c)$	2.	______________
3.	$3a + (3b + c) = 3a + (c + 3b)$	3.	______________
4.	Thus, $3(a + b) + c = 3a + (c + 3b)$	4.	______________

17. given a non-negative number of arithmetic, write its reciprocal.

18. state the property of multiplicative inverses, i.e. a and b are multiplicative inverses if and only if $(a)(b) = 1$.

19. given a non-negative number of arithmetic, write its multiplicative inverse.

20. state that 0 has no multiplicative inverse.

UNIT IV. Negative Numbers of Arithmetic

The student should be able to:

1. construct a number line showing the integers.
2. using the number line tell which of two rational numbers is greater in value.
3. arrange a set of not more than five directed numbers in ascending or descending order.
4. translate verbal statements such as "a loss of three dollars" into an algebraic phrase using directed numbers.
5. name the additive inverse of any given directed number.
6. write the absolute value of any directed number.
7. add, subtract, multiply, and divide directed numbers.
8. state that a minus b means a plus the opposite of b.
9. state that division is multiplication by the reciprocal of the divisor.
10. state the three ways in which the minus sign is most commonly used in algebra, that is, as:
    - a. part of the name of some integers
    - b. as the symbol which represents the operation of subtraction.
    - c. as a shorthand symbol for the phrase "the additive inverse of"
11. add and subtract two monomials, binomials, or trinomials, or combinations of these involving the first power of one or two variables given in either horizontal or vertical form.
12. use the property of (-1) to write equivalent statements for a given algebraic statement. For example:
    - a. $-5 = (-1)(5)$
    - b. $-a = (-1)(a)$
    - c. $-(a + b) = (-a) + (-b)$

UNIT V. Open Sentences - Equations & Inequalities

The student should be able to:

1. identify
   - a. open sentence.
   - b. equation.
   - c. left member.
   - d. right member.
   - e. solution set.
   - f. root.
   - g. inequality.

   NOTE: Replacement sets should be given for each problem now and throughout the course.
2. intuitively solve simple open sentences by guessing.
3. test by substitution whether or not a given number is the root of a given open sentence.
4. using pencil and paper, solve linear equations in one unknown using the addition property of equality.
5. using pencil and paper, solve linear equations in one unknown using the multiplication property of equality.
6. using pencil and paper, solve the following types of linear equations:
   - a. $2a - 13 = 30$
   - b. $5b + 9 - 3a = 20$
   - c. $15 - 4a + 3a = 17$
   - d. $5d = 7 = 3d$
   - e. $6(x - 4) = 17$
   - f. $7(y + 4) = -14$
   - g. $3(5 - z) = 7$
   - h. $-6(6 - 4x) = 19$
   - i. $5(3 + 2x) - 4x = 7x - 9$
7. graph the solution sets of these above types of equations on a number line.
8. state the addition and multiplication properties of inequalities.

9. using pencil, paper, and the properties of inequalities, solve the following types of linear inequalities:

   a. $5a > 10$

   b. $-6b \leq 13$

   c. $d + 4 > 9$

   d. $5(2a - 1) \leq -4$

   e. $7(3e + 1) - 2e \geq 3(2e - 1)$

   f. $\frac{a}{2} < 6$

   g. $\frac{-3}{4} c \leq -7$

10. graph the solution sets of these above types of inequalities on a number line.

UNIT VI. Polynomials

The student should be able to:

1. identify a polynomial in one or two variables.
2. name a polynomial according to the number of terms - monomial, binomial, and trinomial.
3. name the degree of a polynomial.
4. arrange a polynomial in one variable in order of ascending or descending powers of the variable.
5. add and subtract polynomials in both horizontal and vertical notation. (Review additive inverse of a polynomial)
6. state the basic laws of exponentiation in both symbols and words:
    a. $a^m \cdot a^n = a^{m+n}$, where m and n are positive integers.
    b. $(a^m)^n = a^{mn}$, where m and n are positive integers.
    c. $a^m \div a^n = a^{m-n}$, where m and n are positive integers and $m > n$.
    d. $a^m \div a^n = \frac{1}{a^{n-m}}$, where m and n are positive integers and $m < n$.
    e. $(ab)^m = a^m b^m$, where m is a positive integer.
7. state the definitions for a^0, $(a \neq 0)$, and a'.
8. simplify an expression involving one-step application of the laws 6(a) - 6(e).
9. simplify an expression involving several applications of the laws 6(a) - 6(e).
10. multiply polynomials involving the product of:
    a. a monomial and a polynomial of more than one term.
    b. two polynomials of more than one term and less than four.
11. recite a rule for determining the product of two binomials (FOIL) and squaring a binomial.

12. find the product of any two binomials without pencil and paper.

13. divide a polynomial of more than one term by a monomial.

14. divide a polynomial of more than one term by a binomial.

UNIT VII. Special Products and Factoring

The student should be able to:

1. distinguish between prime and composite numbers.
2. write an integer as the product of prime factors.
3. name the GCF of two or more integers.
4. express a monomial as the product of prime factors.
5. name the GCF of two or more monomials.
6. name the following special products:
    a. difference of two squares.
    b. perfect square trinomial.
7. factor into prime factors a polynomial involving one-step factoring of the following types:
    a. common monomial factor.
    b. difference of two squares.
    c. trinomials, general case with integral coefficients.
    d. polynomials of four terms by grouping to reveal a common binomial factor.
8. state a procedure for factoring a polynomial into prime polynomial factors.
9. using pencil and paper, factor into prime polynomial factors, polynomials using two or more types of factoring.
10. state that the product of two or more quantities is zero, if and only if at least one of the factors is zero.
11. using pencil and paper, solve problems of the following types:
    a. $(x - 2)(x + 1) = 0$
    b. $(2a + 1)(a - 3) = 0$
    c. $c^2 + 2c + 1 = 0$
    d. $x^2 - 4 = 0$
    e. $2y^2 + 3y + 1 = 0$
    f. $w^2 + 3w = -10$
    g. $z^2 = 25$
    h. $0(x - 9) = 0$
    i. $(x)(x - 4) = 0$
    j. $y^2 = 5y + 6$
    k. $x^3 - 6x^2 - 40x = 0$
12. multiply at sight any polynomial by (-1) and name that the additive inverse of the polynomial.

UNIT VIII. Fractions

The student should be able to:

1. define a fraction as the indicated quotient of two integers or polynomials.
2. identify the numerator and denominator of a given fraction.
3. determine which value or values of the variable make the denominator of a given fraction zero and, hence, are not permissible replacements.
4. reduce to lowest terms a fraction whose numerator and denominator are polynomials.
5. compute the product of two or more fractions including such cases as:
   - a. $\frac{x - y}{x} \cdot \frac{y}{y - x}$
   - b. $5c^2 \cdot \frac{c}{3}$
   - c. $(3x)\left(\frac{2x - 4}{x^2 - 9}\right)$
   - d. $\frac{x + 1}{2x + 3} \cdot \frac{x + 2}{x - 2}$
6. compute the quotient of two rational expressions.
7. add and subtract two or more rational expressions which have equal denominators.
8. calculate the LCM of two or more polynomials.
9. add and subtract two or more rational expressions which have unequal denominators.
10. simplify a complex fraction whose numerator and denominator are rational expressions.
11. calculate the ratio of two quantities.
12. determine the fourth term of a proportion in the form $\frac{a}{b} = \frac{c}{d}$
13. solve equations and inequalities with fractional coefficients.

UNIT IX. Graphs and Sentences in Two Variables

The student should be able to:

1. identify:
   a. coordinate axes.
   b. origin.
   c. quadrant.
   d. abscissa, ordinate.
   e. ordered pair.
2. graph an ordered pair in the Cartesian plane.
3. name the quadrant in which a point lies given its coordinates.
4. determine if a point lies on a given axis given its coordinates.
5. state that the point with coordinates (x, y) can lie in any quadrant or on either axis.
6. distinguish between subscripts and exponents.
7. solve equations of the form $Ax + By + C = 0$ for y in terms of x.
8. determine several solutions (ordered pairs) to an open sentence in two variables.
9. graph, using the chart method, linear equations in two variables.
10. determine the x and y intercepts of a linear equation in two variables by (a) graphing, and (b) substitution.
11. graph the solution set of the special cases (a) $x = a$ and (b) $y = a$.
12. state the equation of the x and y axes.
13. state that the graph of $x = a$ is a vertical line and that the graph of $y = a$ is a horizontal line.
14. state whether or not an equation is linear.
15. given the graph of a line with several given points, determine the slope of the line.
16. given two points which determine a line, calculate the slope of the line algebraically.

17. state that the slope of a line is constant regardless of the pair of points used to determine the slope.

18. state that a horizontal line has 0 slope and that the vertical line has no slope defined.

19. distinguish between positive and negative slopes and be able to state their geometric interpretations.

20. plot a line given:

    a. two points.

    b. point-slope.

    c. slope-intercept.

    d. intercepts.

21. plot a line given its equation in:

    a. point-slope form.

    b. $Ax + By + C = 0$ or general form.

22. write the equation of a line given:

    a. its slope and y-intercept.

    b. its slope and the coordinates of one point on the line.

    c. the coordinates of two points on the line.

22. graph inequalities of the form:

    a. $x > a$, $x \geq a$, $x < a$, and $x \leq a$

    b. $y > a$, $y \geq a$, $y < a$, and $y \leq a$

    c. $Ax + By + C > 0$, $Ax + By + C \geq 0$, $Ax + By + C < 0$, and $Ax + By + C \leq 0$

24. using the chart method, graph parabolas of the form $y = ax^2$, $a \neq 0$.

25. determine the common solution to a pair of linear equations in two variables by each of the following methods:

    a. graphing.

    b. substitution--when one of the equations is "easily" solved for one of the variables. This occurs, of course, when one of the variables has a coefficient of one.

    c. addition-subtraction method.

    d. determinants.

UNIT X. The Real Numbers

The student should be able to:

1. define a rational number as the quotient of two integers.
2. given an integer or a decimal with one, two or three places of decimals, write it as a rational number.
3. write a common fraction as a decimal.
4. distinguish between a terminating and periodic decimal.
5. given one of the two standard notations for periodic decimals, write the equivalent.

   Example: $.8\overline{3} = .8333\ldots$

   $.6363\text{:}\ldots = .\overline{63}$

   NOTE: A class discussion on the principle that a rational number in the form $\frac{p}{q}$, where p and q are relatively prime, either terminates in decimal expansion or repeats in a block of fewer than q digits is appropriate at this time.
6. determine by computation which of two given rational numbers is the greater in value.
7. state the trichotomy principle for rational numbers.
8. by averaging, determine a rational number between any two given rational numbers.

   NOTE: A class discussion on the density property is appropriate at this time.
9. given a repeating decimal (nonterminating) of period 1 or 2, determine the equivalent rational number in the form $\frac{p}{q}$.
10. state the principle that all terminating decimals and infinite periodic decimals name rational numbers.
11. state the definition of the square, cube, and fourth roots of a number.
12. identify the index and radicand of the radical $\sqrt[n]{a}$.
13. write the square roots of perfect squares up to 225.
14. state that square roots of negative numbers do not exist in the real number system.

15. state the rules:

a. $(\sqrt{a})^2 = a, a \geq 0$

b. $(\sqrt{a^2}) = a, a \geq 0$

16. use the rules developed in item 15 to simplify expressions involving their one step application.

17. state the product and quotient properties of square roots:

a. $\sqrt{a}\ \sqrt{b} = \sqrt{ab}$, $a \geq 0$ and $b \geq 0$

b. $\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$, $a \geq 0$ and $b > 0$

18. give the square roots of monomials of the form:

a. $100z^2$

b. $49x^2y^2$

c. $\dfrac{9p^2}{w^2}$

NOTE: Restrictions on the variable should not be emphasized at this point. The main objective is that the student can apply the laws of square roots to simplify a monomial.

19. calculate square roots of such numbers as .57, .023, and .0023 by using a table of roots.

20. distinguish between the two meanings of an expression containing a radical sign, i.e. as an operation and as naming a number.

21. calculate the product of two radicals using the product property for such problems as:

a. $\sqrt{7}\ \sqrt{3} = \sqrt{21}$

b. $(5\sqrt{3})(7\sqrt{2}) = 35\sqrt{6}$

22. simplify radicals such as:

a. $\sqrt{20}$

b. $5\sqrt{96}$

c. $\frac{1}{3}\sqrt{27}$

d. $\frac{1}{5}\sqrt{72}$

e. $\sqrt{\dfrac{7}{8}}$

f. $\sqrt{\dfrac{5}{9}}$

g. $\sqrt{\dfrac{9}{5}}$

h. $\dfrac{2}{\sqrt{7}}$

i. $\dfrac{7\sqrt{3}}{2\sqrt{5}}$

j. $\dfrac{\sqrt{11}}{3\sqrt{2}}$

23. simplify such radicals as:

a. $(\sqrt{a})(\sqrt{8a})$

b. $(5\sqrt{b})^2$

c. $(-2\sqrt{a})(6\sqrt{ab})$

d. $\sqrt{7a^2}$

e. $\sqrt{15a^2b}$

f. $(\sqrt{7ab})^2$

g. $\frac{1}{2}\sqrt{8a}\ \sqrt{12a}$

h. $\sqrt{\frac{6a}{7}}$

i. $\sqrt{\frac{5a^2}{3}}$

j. $\sqrt{\frac{7}{2a}}$

k. $\sqrt{\frac{3x^2}{2}}$

l. $\sqrt{\frac{9y^2}{3x}}$

m. $\frac{\sqrt{x}}{\sqrt{y}}$

n. $\frac{\sqrt{8x}}{\sqrt{2z}}$

NOTE: The point is that at this level all indices should be two, the quantities involved should be monomials, and only the first and second degree should be employed.

24. identify similar terms or similar radicals in a group such as: $\sqrt{3}$, $\sqrt{2}$, $\sqrt[3]{3}$, $7\sqrt{2}$, $2\sqrt{7}$.

25. add and subtract radicals.

26. calculate the product of binomials which contain radicals.

27. determine the conjugate of real numbers of the form: $a + \sqrt{b}$, $a - \sqrt{b}$, and $c\sqrt{b}$.

28. rationalize denominators of real numbers of the form:

$$\frac{a}{\sqrt{b} - \sqrt{c}}, \quad \frac{a}{\sqrt{b} + \sqrt{c}} \quad \text{and} \quad \frac{a\sqrt{b} + c\sqrt{d}}{d\sqrt{f} + g\sqrt{h}}$$

29. solve radical equations with one radical whose radicand can be a monomial or binomial. He must check for extraneous roots.

30. define the real numbers as the set of all decimals.

UNIT XI. Relations, Functions and Variation

The student should be able to:

1. distinguish between a set of elements which are not ordered pairs and a set whose elements are ordered pairs.
2. list the first coordinates and second coordinates of a set of ordered pairs.
3. define a relation as a set of ordered pairs.
4. given a finite relation in roster form, write its domain and range.
5. graph a relation, given the set of ordered pairs.
6. given the graph of a relation, determine its domain and range.
7. given a rule (formula) graph the relation on a limited domain, i.e., a subset of the reals.
8. given a table of values, find the graph of a relation.
9. given a table of values, write a relation in ordered pair notation.
10. state that a relation may be defined by a set of ordered pairs, graph, formula (rule), or table of values.
11. given a table of values defining a linear relation of the form $y = mx$ or $y = x + a$, find the correct formula and then determine missing values.
12. define a function as a relation whose elements contain distinct first members.
13. given a set of ordered pairs, tell whether it defines a function or not.
14. write the domain and range of a function defined by:
    a. roster.
    b. table of values.
    c. graph.
15. tell whether a graph defines a function or relation.
16. given the set of ordered pairs, determine if it is a direct variation.
17. determine by examining a linear graph, if it is one of direct variation.

18. given a direct variation defined by a table of values, write a rule relating the domain and range, i.e., a statement of the form $y = mx$.

19. given either a table of values or a rule defining a direct variation, write the constant of proportionality.

20. identify the means and extremes of a proportion given in the form $\frac{a}{b} = \frac{c}{d}$ or $a:b = c:d$.

21. state the product property of proportions.

22. determine whether two ratios are equal.

23. solve (for a variable term in) a proportion using the product property of proportions.

24. given an English sentence describing a direct variation, write a formula correctly describing this result.

25. given a set of ordered pairs or table of values, determine whether this describes an inverse variation.

26. translate English statements concerning an inverse variation into valid formulas.

27. given a set of formulas, identify those which define a direct variation, inverse variation, or neither.

NOTE: Joint variation and combined variation will not be considered.

STUDENT ASSIGNMENT SHEETS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

The previous sections on Topical Sequence and Behavioral Objectives may be used with any modern algebra text. In order for teachers to see how this may be done, the following section uses a typical algebra text, Modern Algebra, Book I, by Dolciani, Berman and Freilich as an illustration.

STUDENT
ASSIGNMENT SHEET

UNIT I

SETS, SENTENCES, AND THE NUMBER LINE

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
1.	Set concept, set membership, one-to-one correspondence, and empty set	Pp. 10-11 Pp. 13-14	P. 12 1,3, 9, 13, 17, 25, 27, 29, 32 Pp. 14-15 Oral Ex. 1, 2, 4, 9, 10, 13, 14, 15, 16 Written Ex. 1, 2, 4, 6, 9, 18, 23-34	
2.	Subsets	P. 18	Pp. 18-19 Oral Ex. 1, 2, 8, 9, 11, 12, 13, 15 Also: Write all subsets of A where $A = \{3, 4\}$.	
		SEE INSTRUCTOR FOR TEST		

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
3.	Numerical equations	Pp. 5-6	P. 6 Written Ex. 1, 3, 4, 6, 9, 12, 13, 15, 18	
4.	Signs of inequality	Pp. 7-8	P. 9 Written Ex. 2, 4, 9, 10, 17, 20, 24, 25, 33, 37	
5.	Identification of expressions involving equations and inequalities		Tell which of the following are equations, inequalities or neither. 1. $\{1,2,3\}$ 2. $8 + 1 = 6 + 3$ 3. $5 = 21 - 10$ 4. $\{a,b,c\} \neq \{1,2,3\}$ 5. $21 + 4$ 6. $13 < 8$ 7. $10 \neq 5 \cdot 2$ 8. $\frac{2}{3} \cdot \frac{5}{7} < 1$ 9. $1 \cdot 7 + 3 \cdot 3 = 5 \cdot 2 - 0 \cdot 2$	
6.	The number line	Pp. 1-2 P. 16	P. 3 Oral Ex. 1-8, 21, 24, 25, 26 Pp. 4-5 Written Ex. 7, 10, 11, 15, 16, 24, 25 P. 17 Written Ex. 1-5, 8, 10, 11, 12, 13, 15	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
7. Symbols of inclusion and order of operation	Pp. 19-21	P. 22 Written Ex. 1,2,5,6,7-15,20	
	P. 23	P. 24 Written Ex. 1,2,4-7,11,12,17,18, 19,23	
	SEE INSTRUCTOR FOR TEST		

UNIT II

VARIABLES

STUDENT
ASSIGNMENT SHEET

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
8.	Variables and evaluating open phrases	Pp. 35-37	P. 37 Oral Ex. 1-9, 21-24 Written Ex. 1-9	
9.	Factors, coefficients, exponents	Pp. 40-41	Pp. 42-43 Written Ex. 1, 2, 4, 5, 7, 8, 10, 11, 14, 16, 17, 18, 19, 21, 25, 27, 28, 29, 30, 31, 33, 35, 36 Pp. 41-42 Oral Ex. 15-56 P. 43 Problems 1, 2, 4, 5	
10.	Thinking with variables	P. 51	P. 54 Written Ex. 1, 4, 5, 7, 8, 11, 12, 13, 15, 17, 19, 21, 23 Pp. 52-54 Oral Ex. 1, 3, 6, 8, 12, 13	
11.	Writing open sentences		Pp. 57-58 Oral Ex. 2, 4, 5, 8, 10, 12, 13, 14	

SEE INSTRUCTOR FOR TEST

UNIT III

NON-NEGATIVE NUMBERS OF ARITHMETIC

STUDENT
ASSIGNMENT SHEET

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
12. Axioms of equality	Pp. 69-70	Pp. 69-70 Oral Ex. 1-4	
13. Closure properties of addition and multiplication	Pp. 71-72	P. 72 Oral Ex. 1, 2, 3, 5, 9-12 P. 73 Written Ex. 2, 5, 11	
14. Commutative and associative properties for addition and multiplication	Pp. 73-74	P. 74 Oral Ex. 1-19 (omit 9, 13) 21,24	
15. Distributive property and properties of 1 and 0	Pp. 75-77	P. 78 Oral Ex. 1, 4, 5, 8, 11, 13, 14, 16, 19, 20, 21, 23, 27, 28 P. 79 Written Ex. 1-7, 9, 11, 15, 19, 22, 25, 26, 29	
	SEE INSTRUCTOR FOR TEST		

UNIT IV

NEGATIVE NUMBERS

STUDENT
ASSIGNMENT SHEET

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
16.	Directed numbers	Pp. 111-112	Pp. 112-113 Oral Ex. 1, 4, 5, 6, 11-14, 17, 24, 27, 28 P. 113 Written Ex. 1-12	
17.	Order of rational numbers	P. 114	P. 114 Oral Ex. 1-20 P. 115 Problems 1, 3, 4	
18.	Addition of directed numbers on the number line	Pp. 116-117	Pp. 117-118 Oral Ex. 1, 3, 7, 9, 11, 12, 13, 17, 18, 19, 20, 22, 23, 24 Written Ex. 2, 3, 7, 8, 12	
19.	Additive inverse	Pp. 120-122	P. 122 Oral Ex. 1, 4, 6, 8, 9, 10, 12, 17, 18, 19 Written Ex. 1-8 Do also: 1. 5 + (-5) = ______ 2. (-7) + (+7) = ______ 3. (-3) + (+3) = ______ 4. (+7.2) + (-7.2) = ______ 5. a + (-a) = ______	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
20. Absolute value	P. 123	P. 124 Oral Ex. 1-24	
21. Addition of directed numbers	Pp. 124-126	P. 126 Oral Ex. 1-18 P. 127 Written Ex. 1,2,3,5,7-10,13,14,18, 27-35 P. 128 Problems 1,6	
22. Subtraction of directed numbers	Pp. 128-130	P. 130 Oral Ex. 1,4,5,7,9,11,12,17,18,20, 21,27-32,36 P. 131 Written Ex. 21,22,27,28	
23. Multiplication of directed numbers	Pp. 133-135	P. 135 Oral Ex. 1-21 P. 137 Written Ex. 1,3,5,11,12,15,16	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
24. Product of monomials		Determine the product: 1. $(3x)(2y)$ 6. $(-5ab)(-2bc)$ 2. $(-4z)(3d)$ 7. $(-3x)^2$ 3. $(6c)(-4d)$ 8. $(-5a)^3$ 4. $(-2d)(-4e)$ 9. $(-5x^2)(-3y^2)$ 5. $(6xy)(-2x)$ 10. $(2x)(-3y)(-2z)$	
25. Division of directed numbers	Pp. 138-140	P. 140 Oral Ex. 1-20, 33-42, 49, 51	
26. Combining similar terms	Pp. 133-135	P. 137 Written Ex. 21-24, 26, 27, 31-34, 36-44 Remove the parentheses and combine similar terms: 1. $3(x-2)-7$ 2. $-2(y+8) + 3y$ 3. $4(2x + 5) + 8(-2x - 3)$ 4. $-3(3x + 7) + 2(4x + 7)$ 5. $-2(-7x + 3a) + 5(2x - 6a)$ 6. $-1(6x - 3) - 5(2x + 1)$ 7. $-4(2a + 3b) - 7(-3a + b)$ 8. $-5(5y + 3) - 6y + 8$	

SEE INSTRUCTOR FOR TEST

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
27.	Solving open sentences by replacement	Section 2-3	P. 46 **Oral Ex.** 1, 2, 3, 4, 5, 9, 15, 17, 18, 21, 22, 30 Pp. 47-48 **Written Ex.** 1, 3, 4, 5, 7, 11, 16, 18, 19, 20, 22, 23, 25, 27	
28.	The addition and subtraction properties of equality	Pp. 80-82	P. 82 **Oral Ex.** 1, 3, 7, 11, 17, 19 P. 83 **Written Ex.** 1, 3, 6, 7, 8, 10, 11, 21 P. 59 **Problems** 13, 16	
29.	The multiplication and division properties of equality	Pp. 83-84	Solve each equation using the multiplication property of equality. Show an intermediate step. 1. $5a = 15$ 2. $7a = 23$ 3. $16 = 5b$ 4. $-7a = 106$ 5. $-5d = -13$ 6. $\frac{1}{4}f = 7$ 7. $\frac{2}{3}h = -18$ 8. $\frac{4d}{5} = 20$ 9. $\frac{7}{8}f = -21$ 10. $\frac{3}{4}a = -7$ 11. $-\frac{2}{3}n = 15$ 12. $-\frac{5}{6}n = -\frac{3}{4}$	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
		13. $\frac{-2a}{5} = 4$ 19. $\frac{h}{7} = -3$ 14. $\frac{-5m}{5} = \frac{-2}{3}$ 20. $\frac{m}{-2} = -5$ 15. $1.2d = 2.4$ 21. $\frac{-a}{3} = 6$ 16. $3.9 = 1.3f$ 22. $\frac{b}{7} = \frac{1}{2}$ 17. $5.4 = -1.8h$ 18. $-100 = .5a$ 23. $\frac{c}{-2} = -\frac{3}{4}$	
30. Combining terms and use of transformation principles	Pp. 86-88	Pp. 88-89 Written Ex. 2, 3, 4, 5, 7, 8, 9, 10, 11-16, 27, 29, 30, 36, 41, 47, 49	
	Pp. 158-159	P. 158 Oral Ex. 1, 2, 3, 4, 5, 6, 7, 10, 13 P. 59 Problems 4, 8	
31. Solving equations with variables in both members of the equation	Pp. 91-93	P. 93 Written Ex. 1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 14, 15, 16, 18, 20, 21, 23, 24, 26, 28, 30, 31, 32 P. 170 Problems 1, 4, 5, 8 Pp. 58-59 Problems 1, 5, 15	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
32. Solving formulas	Pp. 157-158	P. 159 Written Ex. 2,3,5,8,10,11,15,16,23, 24,25,29,30,31,33,34,35 P. 89 Problems 1,3,6	
33. Properties of inequalities	Pp. 159-162	P. 163 Written Ex. 1,2,3,4,5,7,8,11,12,13, 14,15,20,21,22 P. 89 Problems 5,10	
	SEE INSTRUCTOR FOR TEST		

POLYNOMIALS

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
34. Adding polynomials	Pp. 197-198	Pp. 198 Oral Ex. 1, 3, 4, 5, 7, 9, 10, 11, 12, 14, 17, 18, 20, 21, 22, 23, 24, 27, 29, 30, 31 P. 89 Problems 13, 17	
35. Subtracting polynomials	Pp. 200-201	Pp. 201-202 Oral Ex. 1, 3, 4, 5, 6, 9, 10, 11, 12, 13 16, 17 P. 202 Written Ex. 10, 11, 12, 14, 18, 21 P. 94 Problems 2, 7	
36. The product of powers	P. 203	P. 204 Written Ex. 3, 4, 5, 8, 10, 12, 15, 19, 20, 25 Do the following problems: 1. $2^3 \cdot 2^4$ 2. $x^5 \cdot x^2$ 3. $a^3 \cdot a^2 \cdot a^5$ 4. $3x^6 \cdot x^3$ 5. $y^3 \cdot y^o$	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
37. The power of a product	Pp. 204-205	Do the following problems: 1. $(ab)^2$ 6. $(-2)^2$ 2. $(6a)^2$ 7. $(-2)^3$ 3. $(-2b)^2$ 8. $(3d^2)^3$ 4. $(3xy)^3$ 9. $(-2a^2)^4$ 5. $(d^3)^2$ P. 205 Written Ex. 2, 4, 5, 6, 7, 9, 15, 18	
38. The quotient of powers	Pp. 215-217	P. 217 Oral Ex. 1-10 P. 218 Written Ex. 2, 3, 4, 5, 10, 14, 15, 19, 23	
39. Zero as an exponent	P. 218	Pp. 218-219 Oral Ex. 1-20	
40. Multiplying polynomials by a monomial	Pp. 206-207 Pp. 178-180	Pp. 207-208 Written Ex. 1, 2, 4, 5, 6, 7, 10, 12, 15, 20, 21 P. 202 Written Ex. 17, 20, 24, 27 Pp. 208-209 Problems 1, 2, 4, 9	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
41. Multiplication of two polynomials	P. 209	P. 210 Written Ex. 1,2,3,5,6,7,9,10,12,14, 15,17,19,20,21,27,28,29, 33 P. 212 Problems 2,6	
42. Raising binomials to a power	Pp. 213-214	P. 214 Written Ex. 1,2,3,5,9,11,13 P. 214 Problems 1	
43. Division of polynomials by a monomial	Pp. 219-220	Pp. 220-221 Written Ex. 1,2,3,6,7,10,11,12,13, 14,15,17,18,21,25,28	
44. Division of polynomials by a polynomial	Pp. 221-222	P. 223 Written Ex. 1,2,3,5,6,7,8,9,11,13, 15,16,26,27,28,35	
	SEE INSTRUCTOR FOR TEST		

UNIT VII

SPECIAL PRODUCTS AND FACTORING

STUDENT
ASSIGNMENT SHEET

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
45. Factoring an integer into primes	Pp. 237-239	P. 239 Oral Ex. 1-22 P. 240 Written Ex. 1, 2, 5, 8, 9, 11, 17, 19, 21, 23, 24, 26, 29	
46. Common monomial and polynomial factoring	Pp. 241-242	P. 242 Written Ex. 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22 23, 29, 31, 32, 34, 36	
47. Product of the sum and difference of two numbers	P. 245	P. 245 Oral Ex. 1, 5, 8, 9, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21	
48. **Factoring the difference of two squares**	Pp. 246-247	Pp. 247-248 Written Ex. 1, 2, 4, 5, 7, 10, 11, 13, 15, 16, 21, 22, 23, 27, 29	
49. Squaring a binomial	Pp. 248-249	Pp. 249-250 Oral Ex. 1, 3, 5, 4, 7, 8, 9, 10, 11, 13, 15, 16, 21, 22	
50. Multiplying binomials at sight	Pp. 253-254	P. 254 Oral Ex. 1, 2, 3, 7, 8, 9, 13, 14, 15, 16, 17, 18 P. 254 Written Ex. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 17, 21	

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
51.	**Factoring the product of binomial sums and difference**	Pp. 255-256	Pp. 252-253 Written Ex. 3, 4, 5, 6, 11, 12, 21, 28 P. 256 Oral Ex. 2, 5, 7, 8, 10, 13, 15, 18 P. 256 Written Ex. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 15, 17, 18, 20, 22, 23	
52.	**Factoring the product of a binomial sum and binomial difference**	Pp. 257-258	P. 258 Written Ex. 2, 3, 4, 5, 6, 8, 10, 11, 13, 15, 16, 17, 19, 21, 20, 24	
53.	**Factoring quadratic trinomials**	Pp. 259-260	Pp. 252-253 Written Ex. 7, 8, 9, 13, 15 P. 260 Written Ex. 1, 2, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 20	
54.	**Combining several types of factoring**	P. 261	P. 253 Written Ex. 24, 25, 26, 30 P. 262 Written Ex. 1, 3, 4, 5, 6, 8, 10, 11, 12, 14, 15, 16, 18, 20, 22, 23, 25, 28, 29, 31, 33, 35	
55.	**Working with factors whose product is zero**	Pp. 263-264	P. 264 Written Ex. 2, 4, 7, 8, 13, 14, 15, 17, 18, 19	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
56. **Solving equations by factoring**	Pp. 264-265 Pp. 267-269	P. 266 Written Ex. 1, 3, 4, 6, 7, 8, 9, 11, 12, 14, 16, 17, 19, 20, 22, 23, 24, 26, 27, 29, 30, 31, 33, 35 P. 269 Problems 2, 7, 19	
57. **Additive inverse of polynomials**		**Use the multiplication property of -1 to find the additive inverse of:** 1. $6x$ 2. $4yb$ 3. $-7ad$ 4. $-9xyz$ 5. $x-7$ 6. $x+5$ 7. $2y-5$ 8. $3y+7$ 9. $-5y+9$ 10. $-6x-4$ 11. $6x+(-5)$ 12. $4x^2+5x-1$ 13. $7x^2+5x+9$	

SEE INSTRUCTOR FOR TEST

FRACTIONS

STUDENT
ASSIGNMENT SHEET

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
58. Restricting the replacement set of the variable	Pp. 281-282	P. 282 Written Ex. 1, 2, 4, 7, 8, 9, 14, 15, 17 Oral Ex. 1, 2, 3, 4, 6, 8, 11	
59. Reducing fractions	Pp. 283-284	Pp. 284-285 Written Ex. 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 14, 15, 17, 18, 20, 24	
60. Ratio	Pp. 286-287	P. 287 Oral Ex. 1, 3, 5, 7, 9, 13, 15 Pp. 287-288 Written Ex. 5, 9 Pp. 288-289 Problems 3, 6, 8	
61. Multiplication of fractions	Pp. 292-293	P. 293 Oral Ex. 1, 3, 5, 7, 9, 11, 13, 18, 20, 27, 29 Pp. 293-294 Written Ex. 1, 2, 4, 5, 7, 9, 11, 14, 15, 17, 18, 20, 21, 22, 25, 26, 31, 35, 36	
62. Division of fractions	Pp. 295-296	Pp. 295-296 Written Ex. 1, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 23, 24, 27 7	

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
63.	Multiplication and division of fractions	Pp. 296-297	Pp. 296-297 Written Ex. 1, 3, 5, 8, 11, 14, 15, 20 Pp. 168-169 Problems 1, 4, 6, 11, 17	
		SEE INSTRUCTOR FOR TEST		
64.	Addition and subtraction of fractions with equal denominators	Pp. 297-298	Pp. 298-299 Written Ex. 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 17, 19	
65.	Addition and subtraction of fractions with unequal denominators	Pp. 299-301	P. 300 Oral Ex. 1, 3, 4, 6, 7, 13, 15, 17, 19 Pp. 301-302 Written Ex. 1, 2, 3, 4, 6, 8, 9, 10, 11, 13, 14, 15, 17, 20, 22, 23, 24, 25, 27, 30, 31	
66.	Mixed expressions	Pp. 302-303	P. 303 Written Ex. 2, 4, 7, 9, 11, 13, 15	
67.	Complex fractions	Pp. 304-305	P. 305 Written Ex. 1, 3, 4, 5, 7, 9, 10, 13, 15	
68.	Open sentences with fractional coefficients	Pp. 306-307	P. 307 Written Ex. 1, 3, 5, 8, 9, 12, 14, 16, 17, 21	
69.	Fractional equations	Pp. 312-313	Pp. 313-314 Written Ex. 1, 3, 5, 8, 9, 11, 14, 15, 17, 25	
		SEE INSTRUCTOR FOR TEST		

UNIT IX

GRAPHS OF EQUATIONS

STUDENT
ASSIGNMENT SHEET

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
70.	Open sentences in 2 variables	Pp. 333-335	P. 335 Oral Ex. All problems	
71.	Coordinates in the plane	Pp. 337-338	P. 339 Oral Ex. 2, 4, 6, 7, 9, 11, 13, 15, 17, 21-32 P. 340 Written Ex. 1, 3, 4, 5, 7, 11, 12	
72.	Graphing of linear equation in 2 variables	Pp. 340-341	Pp. 341-342 Oral Ex. 1, 2, 3, 5, 8, 10, 11, 13, 14, 15, 16, 18, 28, 30 P. 342 Written Ex. 1, 3, 5, 6, 7, 10, 11, 13, 15, 17 Graph: 1. $x = 2$ 6. $y = 3$ 2. $x + 3 = 0$ 7. $y = -8$ 3. $x = -4$ 8. $y + 6 = 0$ 4. $x - 5 = 0$ 9. $y - 4 = 0$ 5. $x = 0$	
73.	Slope of a line	Pp. 343-344	Pp. 344-345 Oral Ex. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 16 Pp. 345-346 Written Ex. 1, 3, 5, 6, 8, 9, 10, 11, 12	

SEE INSTRUCTOR FOR TEST

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
74. Slope-intercept form of a linear equation	Pp. 346-348	P. 348 Oral Ex. 1, 3, 5, 6, 7, 10, 11, 14, 15 P. 348 Written Ex. 1, 3, 5, 7, 8, 10, 11, 12, 13, 15	
75. Determining equations of a line given point - slope and point - point	P. 349	P. 350 Written Ex. 1, 2, 4, 5, 6, 9, 10, 12, 13, 14, 16, 18	
76. Graph inequalities in two variables	Pp. 350-352	P. 352 Oral Ex. 1, 3, 7, 8, 9, 12, 13, 14, 15 P. 352 Written Ex. 1, 3, 5, 6, 7, 10, 11 Graph: $y = x^2$ and $y = \sqrt{x}$	
77. Solution of simultaneous equations - graphic method	Pp. 367-369	P. 370 Written Ex. 1, 3, 5, 9	
78. Solution of simultaneous equations - addition subtraction method	Pp. 370-371	P. 372 Written Ex. 2, 3, 6, 8, 14	
79. Solution of simultaneous equations - multiplication in the addition-subtraction method	Pp. 374-375	P. 376 Written Ex. 1, 3, 6, 10	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
80. Solution of simultaneous equations - substitution method	P. 378	P. 378 Written Ex. 1, 3, 4, 6, 10	
81. Solution of simultaneous equations - determinants	Explanation by instructor	Evaluate the following determinants: 1. $\begin{vmatrix} 3 & 5 \\ 1 & 2 \end{vmatrix}$ 4. $\begin{vmatrix} 4 & -1 \\ 0 & 6 \end{vmatrix}$ 2. $\begin{vmatrix} -5 & 1 \\ 4 & 6 \end{vmatrix}$ 5. $\begin{vmatrix} \frac{1}{2} & 2 \\ 1 & 4 \end{vmatrix}$ 3. $\begin{vmatrix} -1 & -2 \\ 6 & -3 \end{vmatrix}$ P. 372 Written Ex. (Change directions to: Solve by determinants) 5, 7, 11, 12	
	SEE INSTRUCTOR FOR TEST		

UNIT X

THE REAL NUMBERS

STUDENT
ASSIGNMENT SHEET

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
82.	Nature of rational numbers	Pp. 397-398	P. 399 Oral Ex. 2, 3, 5, 6, 10, 12, 14, 15, 16, 17, 19, 22, 23 P. 400 Written Ex. 15, 16, 20	
83.	Decimal form of rational numbers	Pp. 400-402	P. 403 Written Ex. 1, 4, 5, 7, 11, 13, 17, 18	
84.	Roots of numbers	Pp. 403-405	P. 405 Oral Ex. 1, 2, 3, 4, 5, 7, 8, 13, 14, 17, 18, 23, 24, 27, 28 Pp. 405-406 Written Ex. 1, 2, 3, 7	
85.	Properties of irrational numbers	P. 407	P. 410 Oral Ex. 1, 3, 4, 6, 7, 8, 11, 13, 14, 15, 17, 18	
86.	Product and quotient properties of radicals	Pp. 414-415	P. 415 Oral Ex. 1, 2, 3, 4, 5, 9, 11, 13, 14, 15, 17-31, 33-36 Pp. 415-416 Written Ex. 1, 3-7, 10-13, 16, 18, 19, 23, 26, 28, 29, 30	
		SEE INSTRUCTOR FOR TEST		

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
87. Addition and subtraction of radicals	Pp. 417-418	P. 418 Oral Ex. 1, 2, 4, 5, 7, 9. 11, 12, 15 Pp. 418-419 Written Ex. 1, 2, 4, 5, 6, 8-11, 15	
88. Multiplication of binomials containing radicals	Pp. 419-420	P. 420 Written Ex. 1, 4, 5, 7, 8, 9, 10, 12, 13, 15	
89. Rationalizing denominators containing radicals	P. 420 Top Example 3	P. 420 Written Ex. 17, 18, 19, 21, 24	
90. Solutions of radical equations	P. 421	P. 422 Written Ex. 1, 3, 5, 6, 9, 13, 15, 17, 20	
	SEE INSTRUCTOR FOR TEST		

UNIT XI

RELATIONS, FUNCTIONS AND VARIATION

STUDENT
ASSIGNMENT SHEET

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
91. Relations	Pp. 435-436	P. 437 Oral Ex. 13, 14, 15, 16, 17, 18 P. 437 Written Ex. 1, 2, 6, 7, 8, 9, 11, 12	
92. Functions	Pp. 438-439	P. 440 Oral Ex. 1-15 Pp. 441-442 Written Ex. 1, 3, 5, 9, 14, 15, 17 Graph: $y = \frac{1}{x}$; $x > 0$	
93. Direct variation and proportion	Pp. 442-443	Pp. 444-445 Oral Ex. 11, 12, 13, 16, 18, 22-29 P. 445 Written Ex. 1, 2, 3, 4, 7, 8, 11, 15 Pp. 446-447 Problems 1, 2, 6, 7, 9	
94. Inverse variation	Pp. 447-449	Pp. 450-451 Written Ex. 1, 2, 4, 5, 7 P. 451 Problems 1, 2, 3, 5, 10	
	SEE INSTRUCTOR FOR TEST		

PROBLEMS UNIT

STUDENT
ASSIGNMENT SHEET

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
95. Translating English s sentences into algebraic sentences	P. 51	P. 54 Written Ex. 1, 6, 7, 8, 12, 13, 16, 17-20 P. 55 Problems 3, 6, 9, 11, 12, 14, 17	
96. Solving problems with open sentences	Pp. 56-58	P. 58 Oral Ex. 1-12 P. 58 Problems 1, 5, 7, 9, 10, 17, 20, 23	
97. Number problems		P. 89 Problems 1, 3, 4, 7, 10, 12, 13, 18, 20, 21 P. 94 Problems 3, 5, 7, 11, 12, 15	
98. Problems with directed numbers	Pp. 116-117	P. 119 Problems 1, 4, 6, 12 P. 128 Problems 1, 5, 6, 9	
99. Differences of directed numbers		P. 132 Problems 1, 3, 5, 6, 10, 11	
100. Work problems	Pp. 314-315	Pp. 315-316 Problems 1, 4, 5, 7, 8	

APPENDIX A

DIAGNOSTIC TESTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

DIAGNOSTIC TEST

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. TRUE or FALSE: $6 \in$ {even numbers greater than 10}.

2. List all members of the set of even numbers between 1 and 11.

3. Write a rule describing all members in the set {a, e, i, o, u}.

4. TRUE or FALSE: There is a one-to-one correspondence between the set {1, 9, 11} and the set {even numbers between 3 and 9}.

5. Which one of the following sets is infinite? Place the letter before the correct answer on your sheet.

   A. {people on earth}

   B. {sand grains on a beach}

   C. {states in the Union}

   D. {whole numbers greater than 10}

6. Which one of the following symbols represents the null or empty set? Place the letter of the correct answer on your sheet.

   A. 0

   B. {0}

   C. ϕ

   D. {ϕ}

7. How many members are there in the set {all people in the room over 10 feet tall}?

8. Find all the sets in the list which are subsets of {a, b, 1, 2}. Place the letter or letters of the correct answers on your answer sheet.

   A. {a, 1}

   B. {a, c}

   C. {a, b, 2}

   D. {b}

   E. ϕ

   F. {a, b, 1, 2}

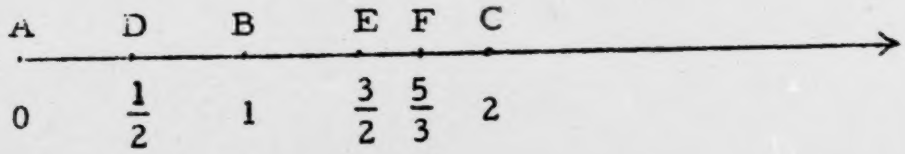
9. Write all the subsets of the set {a, b}.

10. The graphs of the numbers 1, 2, $\frac{1}{2}$, $\frac{3}{2}$, and $\frac{5}{3}$ are given on the number line below.

A. Which point is the graph of the number $\frac{1}{2}$?

B. What is the coordinate of D?

C. What would be the coordinate of a point halfway between C and E?



For problems 11 through 14, indicate whether the question mark should be replaced by (a) the = symbol, (b) the < symbol, or (c) the > symbol to make each statement true. Place the letter of the correct answer on the answer sheet.

11. 16+9 ? 5x5

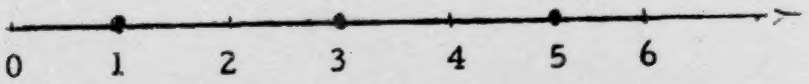
12. 21-4 ? 3x5

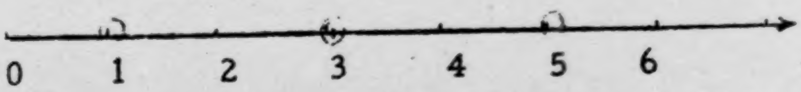
13. 15+21 ? 0

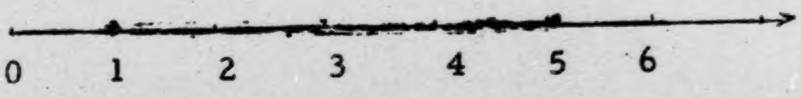
14. 19-3 ? 3+7

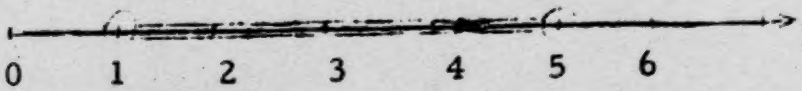
In problems 15 to 18, tell which of the following graphs represents the given set.

15. {1, 3, 5}

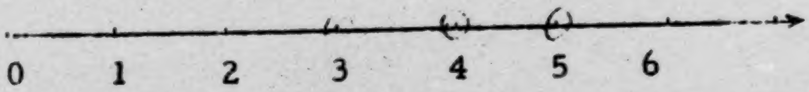
A.


B.


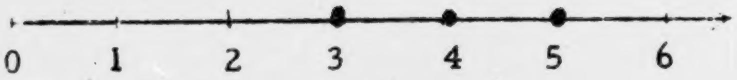
C.


D.


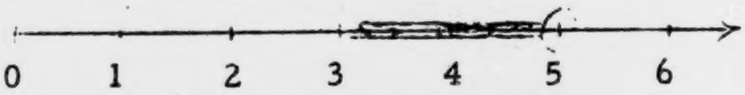
16. {All numbers between three and five}

A.


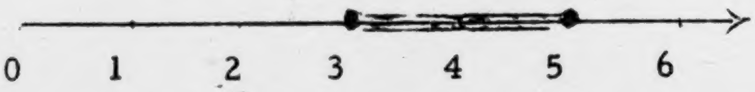
B.



C.

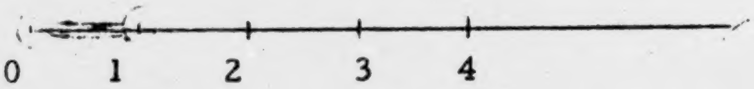


D.

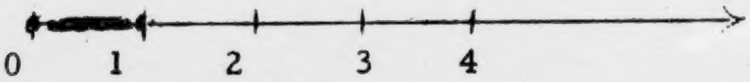


17. {All numbers between 0 and 1, including 0 and 1}

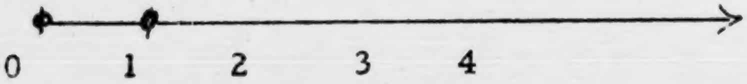
A.



B.



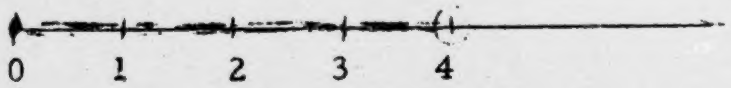
C.



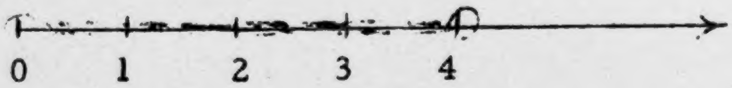
D. ϕ

18. {All numbers greater than 4}

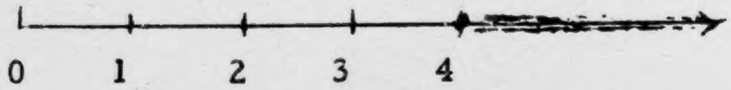
A.



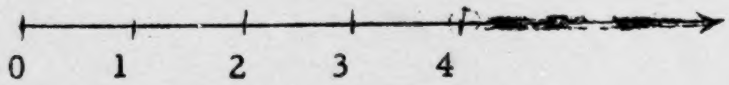
B.



C.



D.



Calculate the value of each number phrase. Place the correct solution on your answer sheet.

19. (16-4) - 2

20. 13(13-9) - 9(13-9)

21. 6-4 ÷ 2x3

22. [6-(4 ÷2)]x 3

23. 6+9 - 4x2 ÷ 10 ÷ 2

DIAGNOSTIC TEST

NAME ______________________ SECTION ______________

TEACHER ______________________ DATE ______________

SCORE ______________________ PERIOD ______________

COMMENTS ______________________

1. ______________________
2. ______________________
3. ______________________
4. ______________________
5. ______________________
6. ______________________
7. ______________________
8. ______________________
9. ______________________
10. A. ______________________

    B. ______________________

    C. ______________________
11. ______________________
12. ______________________
13. ______________________
14. ______________________
15. ______________________
16. ______________________
17. ______________________
18. ______________________
19. ______________________
20. ______________________
21. ______________________
22. ______________________
23. ______________________

Acceptable Score $\frac{16}{23}$

TEACHER'S ANSWER KEY

DIAGNOSTIC TEST

First Year Algebra

1.	True	(1)
2.	$\{2, 4, 6, 8, 10\}$	(1)
3.	{vowels}	(1)
4.	True	(1)
5.	D	(1)
6.	C	(1)
7.	None	(1)
8.	A, C, D, E, F	(2)
9.	$\{a, b\}$, $\{a\}$, $\{b\}$ ϕ	(2)
10.	A. D	(6)
	B. $\frac{1}{2}$	(6)
	C. $1\frac{3}{4}$	(6)
11.	A	(4)
12.	C	(4)
13.	C	(4)
14.	C	(4)
15.	A	(6)
16.	C	(6)
17.	B	(6)
18.	D	(6)
19.	10	(7)
20.	16	(7)
21.	0	(7)
22.	12	(7)
23.	12	(7)

APPENDIX B

ACHIEVEMENT TESTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

UNIT I Sets, Sentences and the Number Line PART I

DIRECTIONS: Do NOT write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. TRUE or FALSE: $5 \notin$ {even numbers greater than 10}

2. List all of the members of the set of odd numbers between 5 and 13.

3. Write a rule describing all the members in the set {a, e, i, o, u}.

4. TRUE or FALSE: There is a one-to-one correspondence between the set {1, 9, 10} and the set {odd numbers between 4 and 10}.

5. Which one of the following sets is infinite? Place the letter of the correct answer on your answer sheet.

   A. {atoms in the head of a pin}

   B. {brilliant algebra teachers}

   C. {whole numbers greater than 15}

   D. {nations in the world}

6. Which one of the following symbols represents the null or empty set? Place the letter of the correct answer on your answer sheet.

   A. ϕ

   B. {0}

   C. $\{\phi\}$

   D. 0

7. How many members are there in the set {all people who have eleven heads} ?

8. Find all the sets in the list which are subsets of {1, 2, b, c}. Place the letter or letters of the correct answer on your answer sheet.

   A. {a, 1}

   B. {a, c}

   C. {a, b, 2}

   D. {b}

   E. ϕ

   F. {b, 1, 2, c}

9. Write all the subsets of the set {0, 1}.

UNIT I Sets, Sentences and the Number Line PART I

NAME ______________________ SECTION ______________

TEACHER ______________________ DATE ______________

SCORE ______________________ PERIOD ______________

1. ______________________

2. ______________________

3. ______________________

____

4. ______________________

5. ______________________

6. ______________________

7. ______________________

8. ______________________

9. ______________________

UNIT I Sets, Sentences and the Number Line PART II TEST A

DIRECTIONS: Do NOT write on this test booklet. Do all scratch work on the paper provided to you. Place correct answer in the appropriate blank of your answer sheet. Do not spend too much time on any one problem.

I. Identify each of the following as an (A) equation, (B) inequality, or (C) neither. Write the letter of the correct answer in the space provided.

1. $7+5 = 12$
2. $8-3 = 14$
3. $27 + 5 \neq 17$
4. $63 + 11 > 4$
5. $8 - 6 > 9$
6. $9 + 3 \times 2$
7. $6 + 5 < 7$

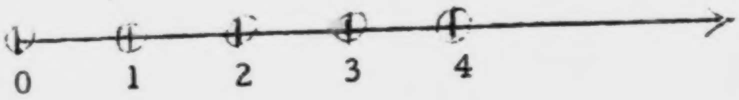
II. Write TRUE or FALSE in the appropriate space.

1. $13+ 3 = 13+3$
2. $3+4\times5 = 60$
3. $7+12>4\times2+5$
4. $6\times0<3+3$
5. $.5\times12<15-9$

GO ON TO THE NEXT PAGE

3. {All numbers between 0 and 4, including 0 and 4}

A.



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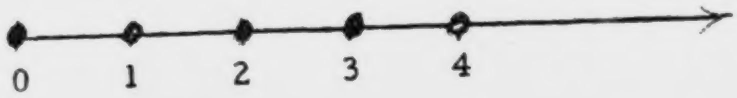

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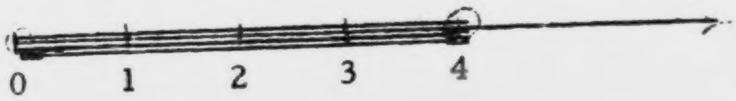

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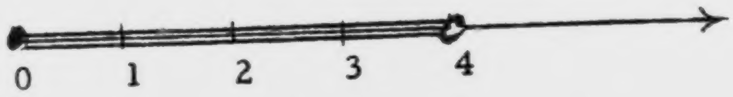
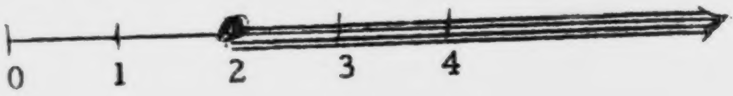
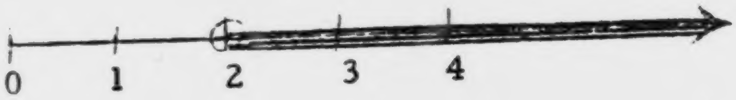


4. {All numbers greater than 2}

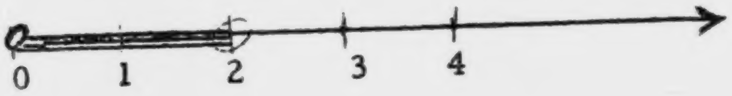
A.



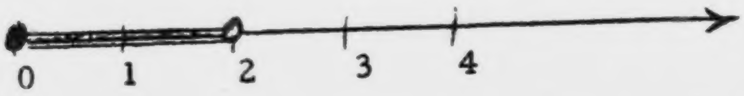
B.



C.



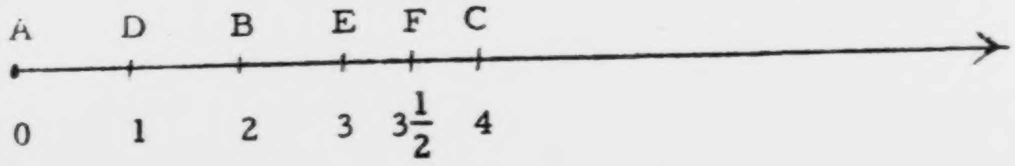
D.



VI. Calculate the value of each number phrase. Place your answer on the sheet provided.

1. (16-10)-5
2. 13(11-8)-3(11-8)
3. 16-4 ÷ 2x4
4. [8-(3+2)] x 4
5. 6+8 - 3x2 + 10÷5

III. The graphs of the numbers 0, 1, 2, 3, $3\frac{1}{2}$, 4 are on the given number line below.


A
D
B
E
F
C
0
1
2
3
$3\frac{1}{2}$
4

1. Which point is the graph of the number 2?
2. What is the coordinate of F?
3. What would be the coordinate of the point halfway between A and B?

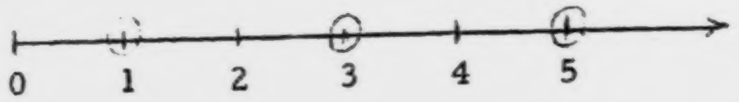
IV. Indicate whether the ? should be replaced by (A) the symbol =, (B) the < symbol or (C) the > symbol to make each statement true.

1. 16+4 ? 3x7
2. 21-6 ? 3x5
3. 5+13 ? 0
4. 19-5 ? 2+8

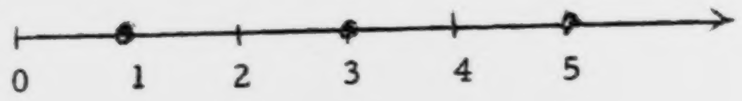
V. Tell which of the following graphs represents the given set.

1. {1, 3, 5}

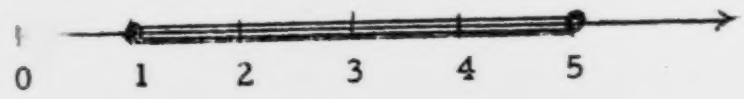
A.



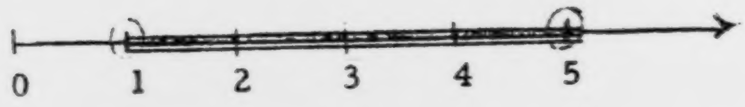
B.



C.

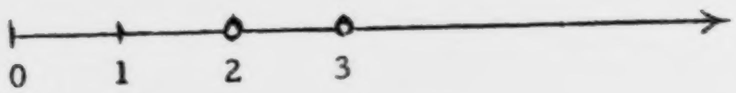


D.

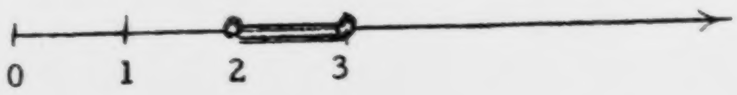


2. {All numbers between 2 and 3}

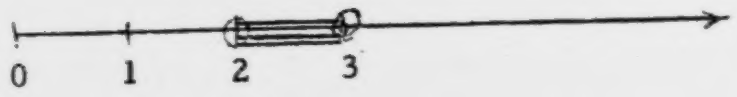
A.



B.



C.



D. ϕ

UNIT I Sets, Sentences and the Number Line PART II
TEST B

DIRECTIONS: Do NOT write on the test booklet. Place all answers on the paper provided.

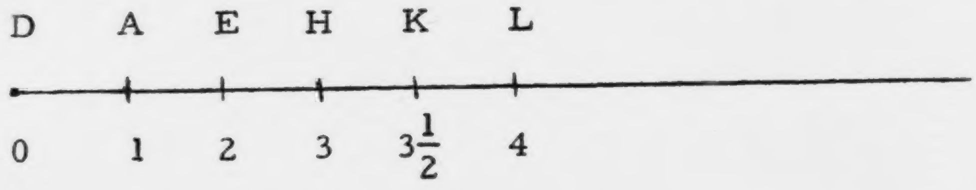
I. Identify each of the following as an (A) equation, (B) inequality, or (C) neither.

1. $7+6 = 13$
2. $3-4 = 4$
3. $27+6 = 76$
4. $76+96>67$
5. $6-4<7$
6. $8+5-6$
7. $9-5<5-3$

II. Write TRUE or FALSE in the appropriate space.

1. $3+14 = 1$
2. $4+5x8 = 44$
3. $5+9>7+9$
4. $9-6<3+4$
5. $4x3>2+0$

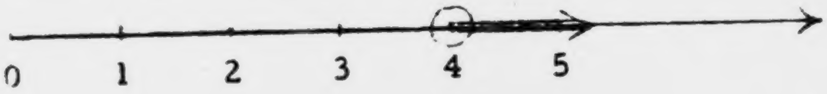
III. The graphs of the numbers 0, 1, 2, 3, $3\frac{1}{2}$, 4 are on the given number line below.



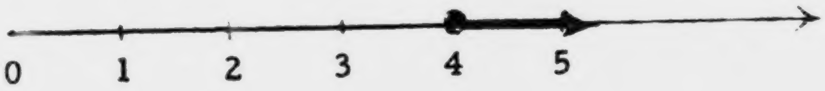
1. Which point is the graph of 3?
2. What is the coordinate of H?
3. What is the coordinate of the point halfway between A and H?

4. {All numbers greater than 4}

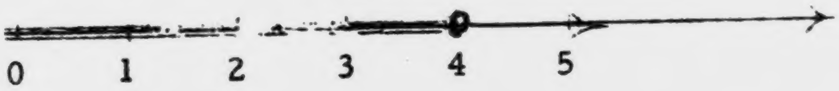
A.



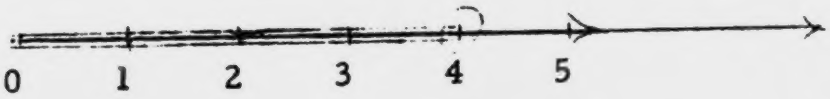
B.



C.



D.



VI. Calculate the value of each number phrase. Place your answer on the sheet provided.

1. 26-(10+4)
2. 12(11-8)-6(11-8)
3. 20-5x2+6
4. 16-4÷ 2x4
5. 16+5-4x5+20÷ 5

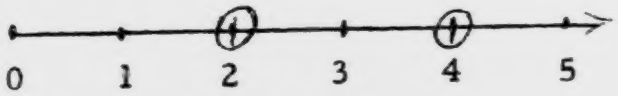
IV. Indicate whether the ? should be replaced by (A) the symbol =, (B) the < symbol, or (C) the > symbol.

1. 17+4 ? 3x5
2. 29-0 ? 5+7
3. 6+6 ? 3x4
4. 19-5 ? 2+3

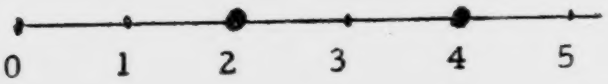
V. Tell which of the following graphs represent the given set.

1. {2, 4}

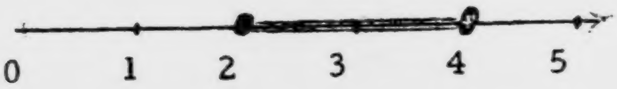
A.



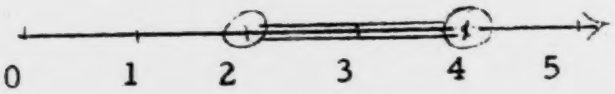
B.



C.

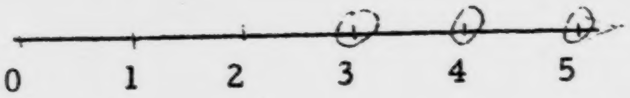


D.

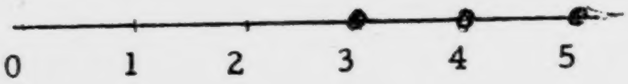


2. {All numbers between 3 and 5}

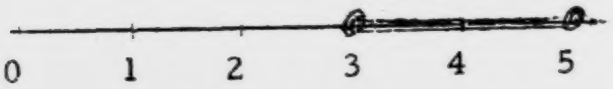
A.



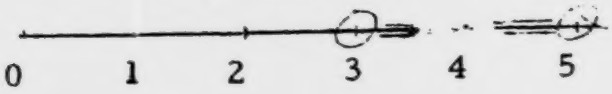
B.



C.

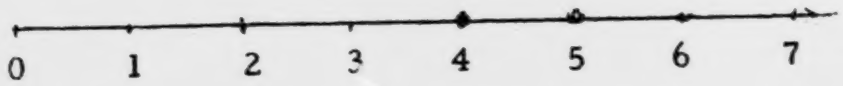


D.

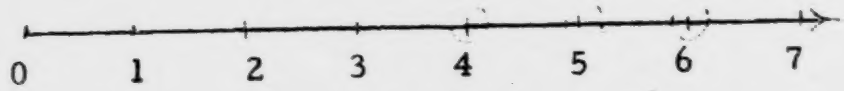


3. {All numbers between 4 and 6 including 4 and 6}

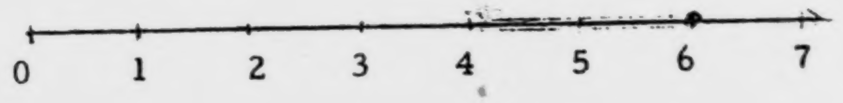
A.



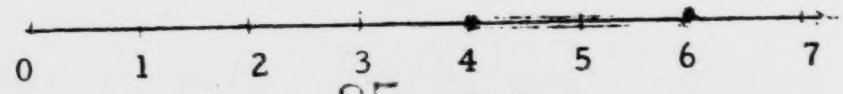
B.



C.



D.



UNIT I Sets, Sentences and the Number Line PART II A B C D

NAME ____________________ SECTION ____________

TEACHER ____________________ DATE ____________

SCORE ____________________ PERIOD ____________

I. - 1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________

II. - 1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________

III. - 1. ____________________
2. ____________________
3. ____________________

IV. - 1. ____________________
2. ____________________
3. ____________________
4. ____________________

V. - 1. ____________________
2. ____________________
3. ____________________
4. ____________________

VI. - 1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________

Unit II VARIABLES Test A

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided to you. Place the correct answer in the appropriate blank of your answer sheet. Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered blank in the paragraph. Write the letter of the correct answer on the answer sheet.

A. CONSTANT B. BASE C. POWER D. REPLACEMENT SET

E. TERM F. VARIABLE G. EXPONENT H. COEFFICIENT

I. FACTOR

Let A = {1, 2, 3, 4} and consider the expression x^2. If x can be replaced only with numerals of set A, A is called the ____(1)____ of x. Since x is a symbol which is to be replaced with the names of numbers, x is called a (n) ____(2)____. In the expression x^2, x is called the ____(3)____ and 2 is called the ____(4)____. In the expression $32y^2$, 32 is called the ____(5)____ of y^2. 32 is also called a (n) ____(6)____ of the entire expression. In the expression 10x + y, 10x and y are called ____(7)____ of the expression.

8. The expression $15x^2y + 3xy^2 + 7x - 2y$ has how many terms?

9. The expression (a-b)(a+b)(b-a) has how many factors?

10. Which expression in the following list is equivalent to $\frac{3}{4}a$?

A. $\frac{3}{4a}$ C. Neither A or B

B. $\frac{3a}{4}$ D. Both A and B

11. Which expression in the following list is equivalent to 3 times a?

A. 3a

B. $3 \cdot a$

C. (3)(a)

D. None of the above

E. A, B and C

12. If $b = 3$, the value of $2b^2$ is what?

13. If $b = 3$, the value of $(2b)^2$ is what?

If $a = 1$, $b = 2$, and $c = 3$, evaluate each of the expressions from number 14 to number 16.

14. $3a + b^2$

15. $(3a + b)^2$

16. $(c + 2)(c + 2b^2)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17 to 23.

17.	$n + 4$	a number increased by 4
18.	$a - 8$	a number diminished by 8
19.	$5b$	5 more than a number
20.	$\frac{x}{3}$	one-third of a number
21.	$2t - 1$	one less than twice a number
22.	$5(w + 2)$	2 more than five times a number
23.	$2 - b$	2 less than some number

Write an algebraic expression for each English expression in problems 24 through 32. Use the variable suggested.

24. the sum of x and 5

25. 7 less than a

26. 5 diminished by n

27. 7 times c

28. the sum of 6 and two times d

29. 2 less than three times f

30. 5 times the sum of m and 2

31. 2 times w is greater than 3

32. A number x increased by 7 is 15.

Write as a power

33. $b \cdot b \cdot b$

34. $2 \cdot 2 \cdot 2 \cdot 2$

35. $(6a)(6a)$

36. COMPLETION: The value of 0 to any positive power is ____________.

37. COMPLETION: The value of 1 to any positive power is ____________.

Perform the indicated operations in problems 38 - 42.

38. $4^2 =$ ________

39. $2^5 =$ ________

40. $(4a)(2a) =$ ________

41. $(3a)^3 =$ ________

42. $(9x)^2 =$ ________

Unit II VARIABLES Test B

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided to you. Place the correct answer in the appropriate blank on your answer sheet. Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered blank in the paragraph. Write the letter of the correct answer on the answer sheet.

A. CONSTANT B. BASE C. POWER D. REPLACEMENT SET
E. TERM F. VARIABLE G. EXPONENT H. COEFFICIENT
I. FACTOR

Let $A = \{3, 5, 6, 7,\}$ and consider the expression x^3. If x can be replaced with only numerals of the set A, A is called the _____(1)_____ of x. Since x is a symbol which is to be replaced with the names of numbers, x is called a (n) _____(2)_____. In the expression x^3, x is called the _____(3)_____ and 3 is called the _____(4)_____. In the expression $16y^2$, 16 is called _____(5)_____ of y^2. 16 is also called a (n) _____(6)_____ of the entire expression. In the expression $10y+x$, $10y$ and x are called _____(7)_____ of the expression.

8. The expression $7x^2y+5xy^2+3x+y$ has how many terms?

9. The expression $(x-y)(x+y)(y-x)$ has how many factors?

10. Which expression in the following list is equivalent to $\frac{3}{5}a$?

A. $\frac{3}{5a}$ C. Neither A or B

B. $\frac{3a}{5}$ D. Both A and B

11. Which expression in the following list is equivalent to 4 times a?

A. $4a$

B. $(4)(a)$

C. $4 \cdot a$

D. All of the above

12. If $b=2$, the value of $4b^2$ is what?

13. If $b=2$, the value of $(4b)^2$ is what?

If $a=2$, $b=1$ and $c=3$, evaluate each of the expressions in problems 14-16.

14. $2a+b^2$

15. $(2a+b)^2$

16. $(b+2)(b+c^2)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17-23.

17.	$n+2$	a number increased by 2
18.	$a+8$	a number diminished by 8
19.	$7b$	7 more than a number
20.	$\frac{x}{4}$	one-fourth of a number
21.	$2y-1$	one less than twice a number
22.	$3(w+2)$	two more than three times a number
23.	$7-b$	7 less than some number

Write an algebraic expression for each English expression in problems 24-32. Use the variable suggested.

24. the sum of x and 9

25. 12 less than a

26. 11 diminished by n

27. 8 times c

28. the sum of 5 and three times d

29. 1 more than three times f

30. 4 times the sum of h and 3

31. 3 times w is less than 2

32. a number y decreased by 10 is 26.

Write as a Power

33. $b \cdot b \cdot b$

34. $2 \cdot 2 \cdot 2 \cdot 2$

35. $(6a)(6a)$

36. COMPLETION: The value of 0 to any positive power is ______________.

37. COMPLETION: The value of 1 to any positive power is ______________.

Perform the indicated operations in problems 38-42.

38. $4^2 =$ ______

39. $2^5 =$ ______

40. $(4a)(2a) =$ ______

41. $(3a)^3 =$ ______

42. $(9x)^2 =$ ______

UNIT II VARIABLES TEST C

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided to you. Place the correct answer in the appropriate blank of your answer sheet. Do not spend too much time on any one problem.

On your answer sheet write the letter of the word which correctly completes each sentence of the paragraph.

A. CONSTANT B. BASE C. POWER D. REPLACEMENT SET

E. TERM F. VARIABLE G. EXPONENT H. COEFFICIENT

I. FACTOR

Let A = {2, 4, 5, 3} and consider the expression y^2. If y can be replaced only with the numerals of set A, A is called the _____(1)_____ of y. Since y is a symbol which is to be replaced with the names of numbers, y is called a (n) _____(2)_____. In the expression y^2, y is called the _____(3)_____ and 2 is called the _____(4)_____. In the expression $20y^2$, 20 is called the _____(5)_____ of y^2. 20 is also called a (n) _____(6)_____ of the entire expression. In the expression 3x+y, 3x and y are called _____(7)_____ of the expression.

8. The expression $10x^2y + 2xy^2 - 6x$ has how many terms?

9. The expression (b-a)(a+b) (a-b)c has how many factors?

10. Which expression in the following is equivalent to $\frac{2}{3}R$?

A. $\frac{2}{3R}$ C. Neither A or B

B. $\frac{2R}{3}$ D. Both A and B

11. Which expression in the following list is equivalent to five times w.

A. 5w

B. $5 \cdot w$

C. (5)(w)

D. None of the above

E. A, B and C

12. If $b=2$, the value of $5b^2$ is what?

13. If $b=2$, the value of $(5b)^2$ is what?

If $a=1$, $b=2$, and $c=3$, evaluate each of the expressions from number 14-16.

14. $4a + b^2$

15. $(3a+2b)^2$

16. $(c+3)(2b^2+c)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the phrase on the right in problems 17-23.

17.	$y + 6$	a number increased by 6
18.	$\frac{a}{2}$	one-half of a number
19.	$2x-1$	one less than twice a number
20.	$B - 4$	a number diminished by 4
21.	$5(x+3)$	3 more than five times a number
22.	$2-R$	2 less than some number
23.	ION	10 more than a number

Write an algebraic express for each English expression in problems 24 through 32. Use the variable suggested.

24. the sum of x and 2

25. 5 less than N

26. 2 diminished by x

27. 17 times b

28. the sum of 4 and three times y

29. 1 less than two times S

30. 3 times the sum of a and 5

31. 2 times N is greater than 5

32. a number c increased by 5 is 15

Write as a power.

33. $x \cdot x \cdot x$

34. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

35. $(5b)(5b)$

36. COMPLETION: The value of 0 to any positive power is ______________.

37. COMPLETION: The value of 1 to any positive power is ______________.

Perform the indicated operations in problems 38-42.

38. $3^2 =$ ________

39. $2^5 =$ ________

40. $(3b)(4b) =$ _______

41. $(2b)^2 =$ ________

42. $(5y)^3 =$ ________

Unit II VARIABLES Test D

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided to you. Place the correct answer in the appropriate blank on your answer sheet. Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered blank in the paragraph. Write the letter of the correct answer on the answer sheet.

A. CONSTANT B. POWER C. TERM D. FACTOR

E. EXPONENT F. COEFFICIENT G. VARIABLE H. BASE

I. REPLACEMENT SET

Let A = $\{1, 2, 4, 5\}$ and consider the expression y^2. If y can be replaced with only numerals of the set A, A is called the ____(1)____ of y. Since y is a symbol which is to be replaced with the names of numbers, y is called a (n) ____(2)____. In the expression y^2, y is called the ____(3)____ and 2 is called the ____(4)____. In the expression $14y^2$, 14 is called the ____(5)____ of y^2. 14 is also called a (n) ____(6)____ of the entire expression. In the expression 14y+ 2x, 14y and 2x are called ____(7)____ of the expression.

8. The expression $4x^2y+2xy^2+3x+y$ has how many terms?

9. The expression $(x-4)(4-x)(4+x)$ has how many factors?

10. Which expression in the following list is equivalent to $\frac{2}{3}a$?

A. $\frac{2a}{3}$

C. Neither A or B

B. $\frac{2}{3a}$

D. Both A and B

11. Which expression in the following list is equivalent to 6 times b?

A. 6b

B. $6 \cdot b$

C. (6)(b)

D. None of the above

E. A, B and C

12. If b= 2, the value of $3b^2$ is what?

13. If b= 2, the value of $(3b)^2$ is what?

If a= 1, b= 2, and c= 3, evaluate each of the expressions in problems 14-16.

14. $2a+b^2$

15. $(2a+3b)^2$

16. $(c^2+b)(2+a)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17-23.

17.	$y + 3$	a number increased by 3
18.	$6b$	6 more than a number
19.	$\frac{x}{5}$	one-fifth of a number
20.	$y + 5$	a number diminished by 5
21.	$3y-1$	one more than three times a number
22.	$6(w+5)$	six more than a number increased by 5
23.	$6-y$	y less than 6

Write an algebraic expression for each English expression in problems 24-32.

24. the sum of y and 6

25. 8 less than m

26. 12 decreased by y

27. 7 times d

23. the sum of 4 and seven times x

29. 1 less than three times y

30. 7 times the sum of h and 4

31. 4 times v is greater than 6

32. a number m increased by 21 is 43

Write as a power.

33. $b \cdot b \cdot b \cdot b$

34. $4 \cdot 4 \cdot 4$

35. $(7a)(7a)$

36. COMPLETION: The value of 1 to any positive power is ________.

37. COMPLETION: The value of 0 to any positive power is ________.

Perform the indicated operations in problems 38-42.

38. $6^2 =$ ________

39. $3^4 =$ ________

40. $(4a)(3a) =$ ________

41. $(2a)^3 =$ ________

42. $(7x)^2 =$ ________

UNIT II Variables A B C D

NAME ______________________ SECTION ______________

TEACHER ______________________ DATE ______________

SCORE ______________________ PERIOD ______________

1. ______________
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38. ______________
39. ______________
40. ______________
41. ______________
42. ______________

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet. Do all scratch work on the paper provided to you. Do not spend too much time on any one problem.

COMPLETION:

1. The additive identity element is ____________.
2. The multiplicative identity element is ____________.
3. By the transitive property of equality, if b= a+ 2 and a+ 2= R, then

   ____________.
4. ____________ has no reciprocal.
5. If x is the multiplicative inverse of y, then (x)(y) = __________.

In problems 6-11, write the answers for each problem. If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $(16)(1)$
7. $15 \cdot 0$
8. $\frac{6}{1}$
9. $\frac{0}{5}$
10. $\frac{7}{0}$
11. $\frac{0}{0}$

Simplify the following expressions.

12. $2(3y)$
13. $\frac{1}{2}(12RS)$
14. $(4x)(8y)$

In problems 15-17, tell whether the statement is TRUE or FALSE.

15. $\{0, 1\}$ is closed under the operation of addition.
16. $\{0, 1\}$ is closed under the operation of multiplication.
17. The set of odd numbers is closed under the operation of multiplication.

In problems 18-22, write the letter of the property which is illustrated by the example below.

A. Reflexive Property of Equality

B. Symmetric Property of Equality

C. Transitive Property of Equality

D. None of these

18. If $8 = 9-1$, then $9-1 = 8$.

19. $4(3\cdot 2) = (4\cdot 3)2$

20. $5 = 5$

21. If $4-1 = 3$ and $3 = 2+1$, then $4-1 = 2+1$

22. If $4+2 = 6$, then $6 = 4+2$

In problems 23-27, write the letter of the property which is illustrated by the example below.

A. Commutative Property of Addition

B. Associative Property of Addition

C. Commutative Property of Multiplication

D. Associative Property of Multiplication

E. Distributive Property of Multiplication over Addition

23. $5(3+2) = 5\cdot 3 + 5\cdot 2$

24. $7+9 = 9+7$

25. $3(2n) = (3\cdot 2)n$, for all numbers n

26. $5+(4+1) = (5+4)+1$

27. $3+(2+7) = (2+7)+3$

In problems 28-32, write the letter of the property which is illustrated by the example below.

A. Additive Property of Zero

B. Multiplicative Property of Zero

C. Multiplicative Property of One

D. None of these

28. $5\cdot 0 = 0$

29. $(9\cdot 3)+0 = 9\cdot 3$

30. $12+1 = 13$

31. $16\cdot 1 = 16$

32. $0\cdot 14 = 14$

Write the reciprocal of:

33. $\frac{3}{3}$

34. 2

35. 1

36. Which term is similar to 6a? Write the letter of the correct answer on the answer sheet.

    A. 6ab

    B. 4a

    C. 6b

    D. 6

    E. None of these

In problems 37-40 combine by adding or subtracting similar terms.

37. $5a+7a$

38. $12q-4q+11$

39. $22v+9w-10v$

40. $2(R+S)+4R-1$

Unit III Non-Negative Numbers of Arithmetic Test B

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet. Do all scratch work on the paper provided to you. Do not spend too much time on any one problem.

COMPLETION:

1. The multiplicative identity element is ________.
2. ________ has no reciprocal.
3. The additive identity element is ________.
4. If x is the multiplicative inverse of a, then (x)(a) = ________.
5. By the transitive property of equality, if $B = a + 2$ and $a + 2 = D$, then ________.

In problems 6-11, write the answers for each problem. If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $\frac{7}{1}$
7. $\frac{0}{5}$
8. (6)(1)
9. $\frac{0}{0}$
10. $7 \cdot 0$
11. $\frac{5}{0}$

Simplify the following expressions.

12. 9(4a)
13. $\frac{1}{3}(15xy)$
14. (7x)(9y)

In problems 15-17, tell whether the statement is TRUE or FALSE.

15. {0, 1} is closed under the operation of multiplication.
16. {0, 1} is closed under the operation of addition.
17. The set of odd numbers is closed under the operation of addition.

In problems 18-22, write the letter of the property which is illustrated by the example below.

A. Reflexive Property of Equality

B. Symmetric Property of Equality

C. Transitive Property of Equality

D. None of these

18. If $4-1 = 3$ and $3 = 2+1$, then $4-1 = 2+1$.

19. If $7 = 5+2$, then $5+2 = 7$

20. $6(3\cdot 5) = (6\cdot 3)5$

21. If $6+2 = 8$, then $8 = 6+2$

22. $7 = 7$

In problems 23-27, write the letter of the property which is illustrated by the example below.

A. Commutative Property of Addition

B. Associative Property of Addition

C. Commutative Property of Multiplication

D. Associative Property of Multiplication

E. Distributive Property of Multiplication over Addition

23. $7+2 = 2+7$

24. $6+(3+5) = (6+3)+5$

25. $9+(2\cdot 3) = (2\cdot 3)+9$

26. $3(6+1) = 3\cdot 6 + 3\cdot 1$

27. $4(3\cdot n) = (4\cdot 3)n$

In problems 28-32, write the letter of the property which is illustrated by the example below.

A. Additive Property of Zero

B. Multiplicative Property of Zero

C. Multiplicative Property of One

D. None of these

28. $17 \cdot 1 = 17$

29. $0 \cdot 16 = 16$

30. $15 + 1 = 16$

31. $(3 \cdot 2) + 0 = 3 \cdot 2$

32. $4 \cdot 0 = 0$

Write the reciprocal of:

33. $\frac{3}{7}$

34. 9

35. 1

36. Which term is similar to 5b? Write the letter of the correct answer on the answer sheet.

   A. 5ab

   B. 5a

   C. 5

   D. 4b

   E. None of these

In problems 37-40, combine by adding or subtracting similar terms.

37. $9b + 6b$

38. $4q + 7q + 12$

39. $36a + 7b - 20a$

40. $6(a+b) + 3b - 4$

Unit III Non-Negative Numbers of Arithmetic Test C

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do all scrap work on the paper provided to you for this purpose. Do not spend too much time on any one problem.

COMPLETION:

1. The additive identity element is ____________.
2. The multiplicative identity element is _________.
3. By the transitive property of equality, if $a = b + 3$ and $b + 3 = Q$, then ________.
4. __________ has no reciprocal.
5. If a is the multiplicative inverse of b, then $ab =$ _________.

Write the answers for each problem in arithmetic. If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $(1)(20) =$ _________
7. $49 \cdot 0 =$ _________
8. $\frac{71}{0} =$ _________
9. $\frac{8}{1} =$ ________
10. $\frac{0}{0} =$ ________
11. $\frac{0}{9} =$ ________

Simplify the following expressions.

12. $3(4w)$
13. $\frac{1}{3}(24RS)$
14. $(7x)(9y)$
15. TRUE or FALSE: The set $\{0, 1\}$ is closed under the operation of multiplication.
16. TRUE or FALSE: The set $\{0, 1\}$ is closed under the operation of addition.
17. TRUE or FALSE: The set of even numbers is closed under the operation of multiplication.

In problems 18-22, write the letter of the property which is illustrated by the example below.

A. Reflexive Property of Equality

B. Symmetric Property of Equality

C. Transitive Property of Equality

D. None of these

18. If $7 = 8-1$ then $8-1 = 7$

19. $15 = 15$

20. If $6-2 = 4$ and $4 = 3+1$, then $6-2 = 3+1$

21. $5(3\cdot 2) = (5\cdot 3)2$

22. If $3+2 = 5$ then $5 = 3+2$

In problems 23-27, write the letter of the property which is illustrated by the example below.

A. Commutative Property of Addition

B. Commutative Property of Multiplication

C. Associative Property of Addition

D. Associative Property of Multiplication

E. Distributive Property of Multiplication over Addition

23. $7+9 = 9+7$

24. $3(2n) = (3\cdot 2)n$ for all numbers n.

25. $5(3+2) = 5\cdot 3 + 5\cdot 2$

26. $3+(2+7) = (2+7)+3$

27. $5+(4+1) = (5+4)+1$

In problems 28-32, write the letter of the property which is illustrated by the example below.

A. Additive Property of Zero

B. Multiplicative Property of Zero

C. Multiplicative Property of One

D. None of these

28. $0\cdot 14 = 14$

29. $12+1 = 13$

30. $5\cdot 0 = 0$

31. $(9\cdot 3)+0 = 9\cdot 3$

32. $16\cdot 1 = 16$

Write the reciprocal of:

33. $\frac{5}{7}$

34. 6

35. 1

36. Which is similar to 7b:

- A. 7
- B. 4c
- C. 6bc
- D. 4b
- E. None of these

Combine by adding or similar terms.

37. $3a + 7a$

38. $10w - 6w + 12$

39. $23q + 8r - 5r$

40. $3(r + s) + 4r - 1$

Unit III Non-Negative Numbers of Arithmetic Test D

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet. Do all scratch work on the paper provided to you. Do not spend too much time on any one problem.

COMPLETION:

1. By the transitive property of equality, if $N = a - 3$ and $a - 3 = B$, then ______________.
2. The additive identity element is _________.
3. The multiplicative identity element is __________.
4. If x is the multiplicative inverse of y, then $(x)(y) =$ ________.
5. ______________ has no reciprocal.

In problems 6-11, write the answers for each problem. If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $15 \cdot 1$
7. $\frac{5}{1}$
8. $\frac{9}{0}$
9. $9 \cdot 0$
10. $\frac{0}{0}$
11. $\frac{0}{9}$

Simplify the following expressions.

12. $5(3a)$
13. $\frac{1}{5}(20xy)$
14. $(3x)(5y)$

In problems 15-17, tell whether the statement is TRUE or FALSE.

15. The set of odd numbers is closed under the operation of multiplication.
16. $\{0, 1\}$ is closed under the operation of addition.
17. $\{0, 1\}$ is closed under the operation of multiplication.

In problems 18-22, write the letter of the property which is illustrated by the example below.

- A. Reflexive Property of Equality
- B. Symmetric Property of Equality
- C. Transitive Property of Equality
- D. None of these

18. $5(3\cdot 4) = (5\cdot 3)4$
19. $7 = 7$
20. If $7+3 = 10$, then $10 = 7+3$
21. If $5+2 = 7$ and $7 = 6+1$, then $5+2 = 6+1$
22. $9+3 = 9+3$

In problems 23-27, write the letter of the property which is illustrated by the example below.

- A. Commutative Property of Addition
- B. Associative Property of Addition
- C. Commutative Property of Multiplication
- D. Associative Property of Multiplication
- E. Distributive Property of Multiplication over Addition

23. $5+(3+2) = (5+3)+2$
24. $8+3 = 3+8$
25. $6\cdot(3\cdot 5) = (6\cdot 3)5$
26. $4(6+2) = 4\cdot 6 + 4\cdot 2$
27. $3\cdot 5 = 5\cdot 3$

In problems 28-32, write the letter of the property which is illustrated by the example below.

- A. Additive Property of Zero
- B. Multiplicative Property of Zero
- C. Multiplicative Property of One
- D. None of these

28. $7\cdot 0 = 0$
29. $8\cdot 0 = 8$
30. $17\cdot 1 = 17$
31. $18-3 = 15$
32. $(5\cdot 6)+0 = 5\cdot 6$

Write the reciprocal of:

33. 1

34. 6

35. $\frac{7}{3}$

36. Which term is similar to 4c? Write the letter of the correct answer on the answer sheet.

    A. 4b

    B. 4

    C. 6c

    D. 4ac

    E. None of these

In problems 37-40, combine by adding or subtracting similar terms.

37. $8a + 9a$

38. $6a + 4a - 5$

39. $12a - 6b + 4a$

40. $6(x+y) - 3y + 4$

UNIT III Non-Negative Numbers of Arithmetic A B C D

NAME ______________________ SECTION __________

TEACHER ______________________ DATE __________

SCORE ______________________ PERIOD __________

1. ______________
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10. ______________
11. ______________
12. ______________
13. ______________
14. ______________
15. ______________
16. ______________
17. ______________
18. ______________
19. ______________
20. ______________
21. ______________
22. ______________
23. ______________
24. ______________
25. ______________
26. ______________
27. ______________
28. ______________
29. ______________
30. ______________
31. ______________
32. ______________
33. ______________
34. ______________
35. ______________
36. ______________
37. ______________
38. ______________
39. ______________
40. ______________

Unit IV The Negative Numbers Part I
Test A

DIRECTIONS: Do not write on this test booklet. Work carefully, but do not spend too much time on any one problem. Place the answer in the appropriate space of the answer sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1. 5, -9

2. -4, -3

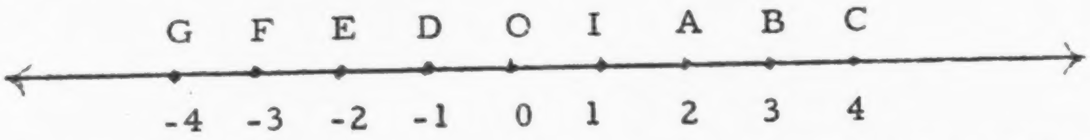
3. -220, 0

4. $\frac{3}{4}, \frac{7}{8}$

5. $\frac{1}{4}, -\frac{1}{4}$

6. TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7 to 9.



7. Which point would be associated with a loss of three dollars?

8. Which point would be associated with a gain of two yards?

9. Which point would be associated with a temperature of one degree below zero?

10. COMPLETION: To subtract b from a, we ____________ the additive inverse of b to a.

11. TRUE or FALSE: Subtraction is a commutative operation.

12. COMPLETION: To divide a by b, we multiply a by the ____________ of b.

13. COMPLETION: To say that $n<0$ for some number n is the same as saying that n is a ____________ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 17.

14. 9

15. -4

16. $-\frac{1}{5}$

17. 0

18. COMPLETION: When two numbers that are additive inverses are added, the sum is always __________________.

19. COMPLETION: The absolute value of + 20 is __________________.

20. $|-4| =$ __________________

21. $|0| =$ __________________

22. TRUE or FALSE: $|-3| = |3|$

In problems 23 to 39, perform the indicated operation and write the answer to each on the answer sheet.

23. $(+15) + (+17) =$ __________________
24. $(+8) + (-4) =$ __________________
25. $(+16) + (-23) =$ __________________
26. $(-17) + (+9) =$ __________________
27. $(-54) + (-19) =$ __________________
28. $(-20) + (+29) =$ __________________
29. $(+9)(+4) =$ __________________
30. $(-4)(-7) =$ __________________
31. $(-17)(+3) =$ __________________
32. $(+16) \div (+4) =$ __________________
33. $(-32) \div (-16) =$ __________________
34. $(-100) \div (+25) =$ __________________
35. $(+25) \div (-5) =$ __________________
36. $(+23) + (-17) + (-30) + (+6)$
37. $(+18) - (+10)$
38. $(-10) - (+10)$
39. $(+31) - (-41)$

Unit IV The Negative Numbers Part I
Test B

DIRECTION: Do not write on the test booklet. Work carefully, but do not spend too much time on any one problem. Place the answer in the appropriate space on the sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1. 4, -7

2. -7, -6

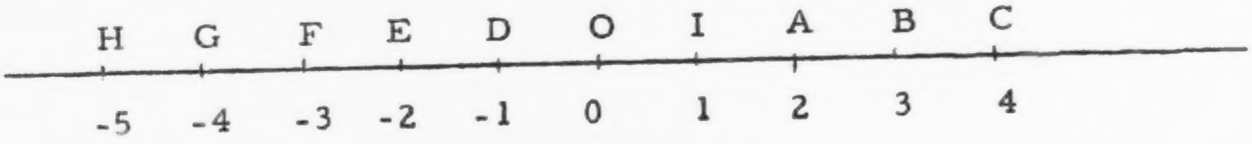
3. -167, 0

4. $\frac{5}{6}, \frac{2}{3}$

5. $\frac{1}{3}, -\frac{1}{3}$

6. TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7-9.



7. Which point would be associated with a gain of three dollars?

3. Which point would be associated with a loss of two yards?

9. Which point would be associated with a temperature of 4 degrees above zero?

10. TRUE or FALSE: To subtract b from a, we subtract the additive inverse of b from a.

11. TRUE or FALSE: Subtraction is a commutative operation.

12. COMPLETION: To divide b by a, we multiply b by the __________ of a.

13. COMPLETION: To say that $n>0$ for some number n is the same as saying that n is a ________________ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 19.

14. 7

15. -3

16. $-\frac{2}{3}$

17. 0

18. TRUE or FALSE: When two numbers that are additive inverses are added the sum is always zero.

19. COMPLETICN: The absolute value of +16 is ________________.

20. $|-3| =$ ____________

21. $|0| =$ ____________

22. TRUE or FALSE: $|5| = |-5|$

In problems 23 to 39, perform the indicated operation and write the answer on the answer sheet.

23. (+14) + (+19)
24. (+7) + (-3)
25. (-16) + (+10)
26. (+12) + (-13)
27. (-63) + (-17)
28. (-4) + (+17)
29. (+8) (+3)
30. (-5) (+6)
31. (-17)(+4)
32. (+18)÷ (+2)
33. (-20)÷ (-5)
34. (-250)÷ (+125)
35. (+36)÷ (-6)
36. (+6) + (-7) + (-9) + (+4)
37. (+21) - (+4)
38. (-6) - (+6)
39. (17) - (-15)

Unit IV

The Negative Numbers

Part I
Test C

DIRECTION: Do not write on the test booklet. Work carefully, but do not spend too much time on any one problem. Place the answer in the appropriate space on the sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1. 3, -7

2. -6, -2

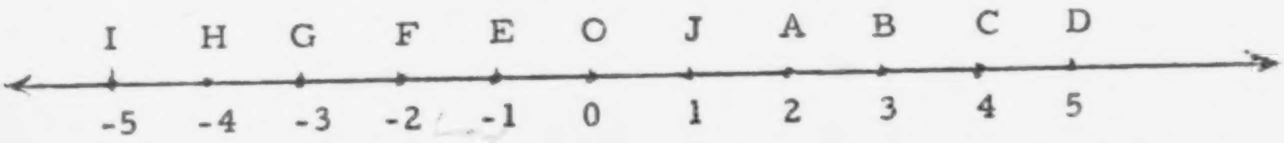
3. -100, 0

4. $\frac{1}{4}, \frac{3}{8}$

5. $\frac{1}{3}, -\frac{1}{3}$

6. TRUE or FALSE: All numbers are positive or negative.

   Refer to the following number line for problems 7 to 9.



7. Which point would be associated with a loss of five dollars?

8. Which point would be associated with a gain of one yard?

9. Which point would be associated with a temperature of two degrees below zero?

10. COMPLETION: To subtract a from b, we ______________ the additive inverse of a to b.

11. TRUE or FALSE: Subtraction is a commutative operation.

12. COMPLETION: To divide a by b, we multiply a by the ____________ of b.

13. COMPLETION: To say that $x<0$ for some number x is the same as saying that x is ______________ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 17.

14. 3

15. -7

16. $-\frac{1}{3}$

17. 0

18. COMPLETION: When two numbers that are additive inverses are added, the sum is always ______________.

19. COMPLETION: The absolute value of +31 is ______________.

20. $|-9|$ = ______________

21. $|0|$ = ______________

22. TRUE or FALSE: $|-11| = |11|$

In problems 23 to 35, perform the indicated operation and write the answer to each on the answer sheet.

23. (+12) + (+19) = ______________

24. (+10) + (-3) = ______________

25. (+18) + (-21) = ______________

26. (-18) + (+9) = ______________

27. (-72) + (-17) = ______________

28. (-30) + (+39) = ______________

29. (+15) (+8) = ______________

30. (-3) (-7) = ______________

31. (-17) (+2) = ______________

32. (+15) ÷ (+3) = ______________

33. (-30) ÷ (-15) = ______________

34. (-125) ÷ (+25) = ______________

35. (+35) ÷ (-7) = ______________

36. (+23) + (-17) + (-20) + (+5) = ______________

37. (+18) - (+6) = ______________

38. (-10) - (+9) = ______________

39. (+50) - (-40) = ______________

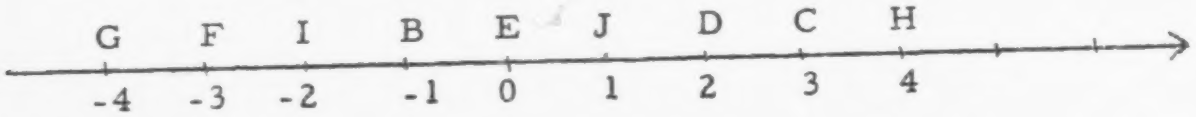
Unit IV The Negative Numbers Part I
Test D

DIRECTION: Do not write on the test booklet. Work carefully, but do not spend too much time on any one problem. Place the answer in the appropriate space on the sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1. 6, -3
2. -2, -4
3. -160, 0
4. $\frac{4}{5}, \frac{2}{3}$
5. $\frac{1}{5}, -\frac{1}{5}$
6. TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7 to 9.



7. Which point would be associated with a loss of four dollars?
8. Which point would be associated with a gain of two yards?
9. Which point would be associated with a temperature of 2 degrees below zero?
10. TRUE or FALSE: Subtraction is commutative.
11. COMPLETION: To say $N<0$ for some number N is the same as saying that N is a ________________ (positive, negative) number.
12. COMPLETION: To divide b by a, we multiply by the ______________ of a.
13. TRUE or FALSE: To subtract b from a, we add the additive inverse of of b to a.

Write the additive inverse of each number in problems 14 through 17.

14. 6
15. -2
16. $-\frac{5}{7}$
17. 0

18. TRUE or FALSE: When two numbers that are additive inverses are added, the sum is always zero.

19. COMPLETION: The absolute value of + 17 is ___________.

20. $|-4| =$ ____________

21. $|0| =$ ____________

22. TRUE or FALSE: $|4| = |-4|$

In problems 23 to 36, perform the indicated operation and write the answer on the answer sheet.

23. $(+7) + (+16)$
24. $(+4) + (-2)$
25. $(-14) + (+7)$
26. $(+11) + (-13)$
27. $(-42) + (-16)$
28. $(-3) + (+14)$
29. $(+9)(+4)$
30. $(-6)(+4)$
31. $(-15)(+3)$
32. $(+20) \div (+4)$
33. $(-15) \div (-5)$
34. $(-75) \div (+25)$
35. $(+42) \div (-6)$
36. $(+4) + (-3) + (+5) + (-9)$
37. $(+6) - (+3)$
38. $(-15) - (+7)$
39. $(+21) - (-6)$

UNIT IV

The Negative Numbers

PART I A B C D

NAME ______________________________ SECTION ________________

TEACHER ____________________________ DATE ________________

SCORE ______________________________ PERIOD ________________

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34. ________________________
35. ________________________
36. ________________________
37. ________________________
38. ________________________
39. ________________________

UNIT IV

The Negative Numbers

PART II
TEST A

DIRECTIONS: Do not write on the test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. 1
2. -4
3. $\frac{12}{5}$
4. $\frac{5}{4}$
5. COMPLETION: If b is the multiplicative inverse of a, then $(a)(b) =$ ________________.
6. COMPLETION: ________________ has no multiplicative inverse.

Place "positive" or "negative" in the appropriate space. (7-8)

The value of any even power of a negative number is a ____(7)____ number, while the value of any odd power of a ____(8)____ number is a negative number.

Perform the indicated operations in problems 9-11.

9. $(-5x)\ (3y) =$ ________________
10. $(-2a)^3 =$ ________________
11. $(-2a)^2 =$ ________________
12. TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under multiplication.
13. TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under addition.
14. $3x - (-2x) =$ ________________
15. $6y + 8y - 24y =$ ________________
16. ADD: $\begin{array}{l} 6x - 2y - 3z \\ \underline{2x + 2y + 4z} \end{array}$
17. $3x - (2x-y) =$ ________________
18. $(5a+2b) + (7a-3b) =$ ________________
19. $(6x-y) - 3\ (2x+y) =$ ________________
20. EVALUATE: If $a = -2$, $b = -3$, and $c = -1$, then $2a-3b+c =$ ____________

UNIT IV The Negative Numbers PART II

TEST B

DIRECTIONS: Do not write on this test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. $\frac{1}{7}$

2. -8

3. $\frac{4}{3}$

4. 1

5. COMPLETION: If b is the multiplicative inverse of a, then (a)(b) = ______________________.

6. COMPLETION: ____________________ has no multiplicative inverse.

Place "even" or "odd" in the appropriate space on your answer sheet. (7-8)

Any ____(7)____ power of a negative number is a negative, while any ____(8)____ power of a negative number is a positive number.

Perform the indicated operation in problems 9-11.

9. $(-35)(7y) =$ ____________________

10. $(-3a)^2 =$ ____________________

11. $(-3y)^3 =$ ____________________

12. TRUE or FALSE: The set of negative integers {... -3, -2, -1} is closed under multiplication.

13. TRUE or FALSE: The set of negative integers {... -3, -2, -1} is closed under addition.

14. $4x - (-3x) =$ ____________________

15. $7y + 9y - 23y =$ ____________________

16. ADD:

$$\begin{array}{r} 5x-2y-4z \\ \underline{3x+2y+5z} \end{array}$$

17. $3x - (5x-2y) =$ ____________________

18. $(4a+9b) + (2a-7b) =$ ____________

19. $(9x-2y) -3\ (x+4y) =$ ____________

20. EVALUATE: If $a = -1$, $b = -2$, and $c = -3$, then $2a-3b+c =$ ____________

UNIT IV
The Negative Numbers
PART II
TEST C

DIRECTIONS: Do not write on the test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. 3
2. -5
3. $\frac{5}{13}$
4. $\frac{6}{5}$
5. COMPLETION: If b is the multiplicative inverse of a, then (a)(b) = ____________________.
6. COMPLETION: __________________ has no multiplicative inverse.

Place "positive" or "negative" in the appropriate space. (7-8)

The value of any even power of a negative number is a _____(7)_____ number, while the value of any odd power of a _____(8)_____ number is a negative number.

Perform the indicated operations in problems 9-11.

9. $(-3y)(5x)$
10. $(-2b)^3$
11. $(-2c)^2$
12. TRUE or FALSE: The set of negative integers {. . . -3, -2, -1} is closed under multiplication.
13. TRUE or FALSE: The set of negative integers {. . . -3, -2, -1} is closed under addition.
14. $5y - (-2y) =$ __________________
15. $3x + 8x - 19x =$ __________________
16. ADD: $\begin{array}{r} 7x - 2y + 3z \\ \underline{2x + 2y - 4z} \end{array}$
17. $3x - (2x+y) =$ __________________
18. $(5c+3b) + (8c-5b) =$ ____________
19. $(6x-y) - 2(3x-y) =$ ____________
20. EVALUATE: If a= -2, b= -3, c= -1, then 3x-2b+c = __________________.

DIRECTIONS: Do not write on this test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. $\frac{2}{5}$

2. -6

3. $\frac{4}{7}$

4. 5

5. COMPLETION: ____________ has no reciprocal.

6. COMPLETION: If b is the multiplicative inverse of a, then (a)(b) = ____________.

Place "positive" or "negative" in the appropriate space. (7-8)

The value of any even power of a negative number is ____(7)____ number, while the value of any odd power of a ____(8)____ number is a negative number.

Perform the indicated operations in problems 9-11.

9. $(-2y)(3x) =$ ____________

10. $(-4a)^2 =$ ____________

11. $(-3a)^3 =$ ____________

12. TRUE or FALSE: The set of negative integers {... -3, -2, -1} is closed under multiplication.

13. TRUE or FALSE: The set of negative integers {... -3, -2, -1} is closed under addition.

14. $4x - (-3x) =$ ____________

15. $3y + 4y - 9y =$ ____________

16. ADD:
$$\begin{array}{r} 9x - 3y + 4z \\ \underline{2x + 3y - 4z} \end{array}$$

17. $9x - (3x-2y) =$ ____________

18. $(4a+2b) + (6a-3b) =$ ________

19. $(2x-y) - 2(3x+y) =$ ________

20. EVALUATE: If $a=-1$, $b=-2$, and $c=-3$, then $2a-3b+c =$ ____________.

UNIT IV The Negative Numbers PART II A B C D

NAME ______________________ SECTION __________

TEACHER ______________________ DATE __________

SCORE ______________________ PERIOD __________

1. ____________________

2. ____________________

3. ____________________

4. ____________________

5. ____________________

6. ____________________

7. ____________________

8. ____________________

9. ____________________

10. ____________________

11. ____________________

12. ____________________

13. ____________________

14. ____________________

15. ____________________

16. ____________________

17. ____________________

18. ____________________

19. ____________________

20. ____________________

UNIT V Open Sentences, Equations, and Inequalities TEST A

DIRECTIONS: Do not write on this test booklet. Place all answers and solutions on the answer sheets provided to you. Do all work on the scratch paper provided to you. Do not spend too much time on any single problem. Unless otherwise stated, the replacement set of all equations is the set of numbers of arithmetic.

Complete the following paragraph by filling in the blanks with words from the following list: Write the letter of the correct answer on the answer sheet.

A. OPEN SENTENCE	B. INEQUALITY	C. SOLUTION SET
D. REPLACEMENT SET	E. RIGHT MEMBER	F. EQUATION
G. LEFT MEMBER	H. SOLUTION	

Consider the set {1, 2, 3, 4, 5} and the statement $2x + 3 = 4x$. Since $2x + 3 = 4x$ contains a variable and, hence, has no truth or falsity, it is called a(n) ______(1)______. When x is replaced by the name of a number, the statement $2x + 3 = 4x$ becomes then either a true or false ______(2)______. If the statement $2x + 3 = 4x$ becomes true when x is replaced with the name of a number, then the replacement number is called a(n) ______(3)______ of the statement. If x can be replaced only with members of the set {1, 2, 3, 4, 5}, then this set is called the ______(4)______ of x.

5. TRUE or FALSE: 3 is a solution of the open sentence

$$x^2 - 5x + 6 = 0$$

Solve each of the following open sentences. The replacement set is the set of numbers of arithmetic. Place the solutions in the answer sheet.

6. $a + 2 = 5$
7. $d + 5 = -7$
8. $-10 = x - 3$
9. $y + \frac{1}{2} = -4$
10. $5 - m = -10$
11. $3x = 9$
12. $5d = 17$
13. $6x = -20$
14. $-15z = 52$

15. $-36 = -7a$

16. $\frac{3}{4}x = 7$

17. $\frac{y}{4} = -3$

18. $1.4x = 6$

19. $2a - 13 = 30$

20. $5b + 9 - 3b = 20$

21. $15 - 4a + 3a = 17$

22. $5d - 7 = 3d$

23. $3(5-z) = 7$

24. $-6(6+4x) = 19$

25. $5(3+2x) - 4x = 7x - 9$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence

$$x - 3 = 2$$

then the solution set of the open sentence is ______________________.

27. Graph the solution set of

$$5x > 10$$

on the number line provided on the answer sheet. The replacement set for x is the set

$$\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-6b \geq 13$

29. $d + 4 > 9$

30. $5(2a-1) \leq 4$

31. $\frac{a}{2} < 6$

32. $-\frac{3}{4}c \leq -7$

33. Graph the solution set of $x \leq 3$ on the number line provided on your answer sheet.

34. John scored twice as many points as Jim. If Jim scored a 45, what was John's score?

UNIT V Open Sentences, Equations and Inequalities TEST B

Complete the following paragraph by filling in the blanks with words from the following list: Write the letter of the correct answer on the answer sheet.

A. open sentence
B. equation
C. left member
D. right member
E. solution set
F. inequality
G. replacement set
H. solution

Consider the set $\{2, 3, 5, 6\}$ and the statement $3x+4=4x$. Since $3x+4=4x$ contains a variable and hence has no truth or falsity, it is called a (n) ___(1)___. When x is replaced by the name of a number, the statement $3x+4=4x$ becomes either a true or false _____(2)_____. If the statement $3x+4=4x$ becomes true when x is replaced with the name of a number, then the replacement number is called a (n) _____(3)_____ of the statement. If x can be replaced only with members of the set $\{2, 3, 5, 6\}$, then this set is called the ____(4)____.

5. TRUE or FALSE: 2 is a solution of the open sentence $x^2-5x+6=0$.

Solve each of the following open sentences. The replacement set is the set of numbers of arithmetic. Place the solutions on the answer sheet.

6. $a+4=5$
7. $d+5=-6$
8. $-10=x+3$
9. $y+\frac{1}{2}=4$
10. $4-m=-10$
11. $3x=12$
12. $5d=11$
13. $6x=-40$
14. $-15z=53$
15. $-37=8a$
16. $\frac{3}{4}x=-15$
17. $\frac{y}{4}=-4$
18. $1.6x=6$

19. $3a-13 = 30$

20. $6b+3-3b = 20$

21. $15-5a+4a = 17$

22. $6d-7 = 4d$

23. $2(5-z) = 6$

24. $-5(6+4z) = 19$

25. $6(3+2x)-4x = 8x-9$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence $3x-2 = 4x$, then the solution set of the open sentences is _____________.

27. Graph the solution set of $4x>8$ on the number line provided on the answer sheet. The replacement set for x is the set $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$.

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-6b \geq 9$

29. $d-4>9$

30. $5(2a+1) \leq 4$

31. $\frac{a}{3}<6$

32. $-\frac{3}{5}c \geq -9$

33. Graph the solution set of $x>-4$ on the number line provided.

34. Bob earned $4 less than Mark. If Mark earned $7, how much did Bob earn?

DIRECTIONS: Do not write on test booklet. Place all answers and solutions on the answer sheets provided to you. Do not spend too much time on any single problem. Unless otherwise stated, the replacement set of all equations is the set of numbers of arithmetic.

Write the letter of correct answers on the answer sheet.

A.	open sentence	E.	right member
B.	inequality	F.	equation
C.	solution set	G.	left member
D.	replacement set	H.	solution

Consider the set {1. 2. 3. 4. 5} and the statement $3x+2 = 4x$. Since $3x+2 = 4x$ contains a variable and, hence, has no truth or falsity, it is called a (n) ____(1)____. When x is replaced by the name of a number, the statement $3x+2 = 4x$ becomes either a true or false ____(2)____. If the statement $3x+2 = 4x$ becomes true when x is replaced with the name a number, then the replacement number is called a (n) ____(3)____ of the statement . If x can be replaced only with members of the {1, 2, 3, 4, 5} , then this set is called the ____(4)____ of x.

5. TRUE or FALSE: 3 is a solution of the open sentence

$$x^2 - 4x + 5 = 0$$

Solve each of the following open sentences. The replacement set is the set of numbers of arithmetic. Place the solutions on the answer sheet.

6. $x + 3 = 5$
7. $y + 5 = -3$
8. $-10 = x - 2$
9. $y + \frac{1}{2} = -8$
10. $5 - m = -15$
11. $3x = 12$
12. $4x = 19$
13. $5x = -18$
14. $-11R = 44$
15. $-35 = -6a$
16. $\frac{2}{3}x = 9$

17. $\frac{y}{7} = -5$

18. $1.4x = 8$

19. $2a - 12 = 40$

20. $5a + 7 - 2a = 20$

21. $12 - 4a + 3a = 15$

22. $5y - 6 = 3y$

23. $3(2-w) = 7$

24. $-4(6+3x) = 13$

25. $5(2+3x)-5x = 7x-3$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence

$$x - 5 = 4$$

then the solution set of the open sentence is ____________________.

27. Graph the solution set of

$$3x > 12$$

on the number line provided on the answer sheet. The replacement set for x is the set

$$\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-5a \geq 12$

29. $b + 3 > 9$

30. $5(2x-1) \leq 6$

31. $\frac{x}{3} < 6$

32. $-\frac{2}{3}R \leq -7$

33. Graph the solution set of $x \leq 5$ on the number line provided on your answer sheet.

34. One number is 15 more than another number. The sum of the number is 65. Find the larger number.

UNIT V Open Sentences, Equations and Inequalities TEST D

Complete the following paragraph by filling in the blanks with words from the following list. Write the letter of the correct answer on the answer sheet.

A. solution set
B. open sentence
C. inequality
D. equation
E. left member
F. right member
G. replacement set
H. solution

Consider the set {1, 2, 3, 4, 6} and the statement $3x-2 = x$. Since $3x-2 = x$ contains a variable and, hence, has no truth or falsity, it is called a (n) ____(1)____. When x is replaced by the name of a number, the statement $3x - 2 = x$ becomes either a true or false ____(2)____. If the statement $3x - 2 = x$ becomes true when x is replaced with the name of a number, then the replacement number is called a (n) ____(3)____ of the statement. If x can be replaced only with members of the set {1, 2, 3, 4, 6}, then this set is called the ____(4)____.

5. TRUE or FALSE: 3 is a solution of the open sentence

$$(x+3)(x-2) = 3$$

Solve each of the following open sentences. The replacement set is the set of numbers of arithmetic. Place the solutions on the answer sheet.

6. $x + 7 = 9$
7. $y + 4 = -3$
8. $-5 = x + 9$
9. $y + \frac{1}{3} = 6$
10. $5 - m = 16$
11. $4x = 16$
12. $7d = 11$
13. $8y = 34$
14. $-15a = 56$
15. $-61 = 5a$
16. $\frac{7}{8}y = -21$
17. $\frac{m}{3} = -2$
18. $1.5x = 7$
19. $2a - 12 = 27$

20. $4b + 5 - 3b = 16$

21. $12 - 6a + 5a = 15$

22. $8d - 5 = 3d$

23. $4(z+6) = 33$

24. $-4(6+2z) = 17$

25. $5(3+2x) - 4x = 8x-9$

26. If $A = \{3, 2, 1, 0\}$ is the replacement set of x in the open sentence $2x-1= 5x$, then the solution set of the open sentence is __________________.

27. Graph the solution set of $6x>12$ on the number line provided on the answer sheet. The replacement set for x is the set $\{0, 1, 2, 3, 4, 5, 6\}$.

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-3y \geq 6$

29. $d-3>9$

30. $4(2a+1) \leq 3$

31. $\frac{a}{7}<6$

32. $-\frac{3}{4}c \geq -12$

33. Graph the solution set of $x \leq -2$ on the number line provided.

34. Mary scored 7 points better than Judy. If Mary scored a 91, what was Judy's score?

UNIT V Open Sentences, Equations and Inequalities A B C D

NAME ______________________________ SECTION ______________

TEACHER ___________________________ DATE ______________

SCORE _____________________________ PERIOD ______________

1. ______________________

2. ______________________

3. ______________________

4. ______________________

5. ______________________

6. ______________________

7. ______________________

8. ______________________

9. ______________________

10. ______________________

11. ______________________

12. ______________________

13. ______________________

14. ______________________

15. ______________________

16. ______________________

17. ______________________

18. ______________________

19. ______________________

20. ______________________

21. ______________________

22. ______________________

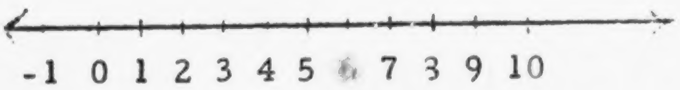
23. ______________________

24. ______________________

25. ______________________

26. ______________________

27.


-1 0 1 2 3 4 5 6 7 8 9 10

28. ______________________

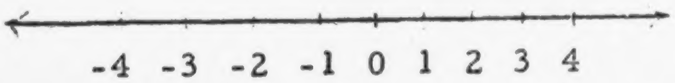
29. ______________________

30. ______________________

31. ______________________

32. ______________________

33.



34. ______________________

UNIT VI Polynomials TEST A

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

Which expressions in the following list are not polynomials? Place the letter preceding the correct answer or answers on the answer sheet.

1. A. $x^3 - 7x^2 + 6x - 5$ E. $(x-2)(x+3)$

B. $\frac{1}{3}x^5 - 2x^2 + 9$ F. $7x^2 - 5x + 3 - \frac{2}{x}$

C. $5x$ G. $\frac{x^2 - 5x + 2}{x - 3}$

D. 4 H. $3x^2y - 2xy^2 + 6y - 3$

2. Which expression in the following list is a trinomial? Place the letter or letters preceding the correct answer or answers on the answer sheet.

A. $5x$ C. $x^3 - 3x + 5$

B. $7x^2 - 2$ D. $7x^4 - 3x^2 + 6x - 2$

3. What is the degree of $5x^4 - 2x^2 + 6x - 3$?

4. What is the degree of $3x^2y - 6xy^2 - 5x + 2y - 3$?

For problems 5-31, write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order.

$$4x^3 - 3 + 4x^2 - 5x$$

A. $-3 - 5x + 4x^2 + 4x^3$

B. $4x^3 + 4x^2 - 5x - 3$

C. $4x^3 - 3 + 4x^2 - 5x$

6. ADD: $(5x^2 - 6x + 9) + (7x - 4)$

A. $5x^2 + x + 5$

B. $6x^3 + 5$

C. $5x^2 - 13x - 13$

D. None of the above

7. ADD: $8x^3 - 2x^2 + 5x - 3$
$\underline{3x^3 + 2x^2 + 7x + 9}$

A. $5x^3 - 2x - 12$
B. $5x^3 + 12 + 6$
C. $11x^3 - 4x^2 + 12x + 6$
D. $11x^3 + 12x + 6$

8. SUBTRACT: $(4x^2-3x-2) - (2x^2-7x+3)$

A. $2x^2 - 10x + 1$
B. $2x^2 + 4x - 5$
C. $6x^2 - 10x + 1$
D. $6x^2 + 4x - 5$

9. SUBTRACT: $(2x^3-4x^2-7) - (2x^2-2x+3)$

A. $-4x^2 - 2x - 10$
B. $-4x^2 + 2x - 4$
C. $2x^3 - 2x^2 - 2x - 4$
D. $2x^3 - 6x^2 + 2x - 10$

10. SUBTRACT: $7x^2y - 3xy^2$
$\underline{3x^2y - 3xy^2}$

A. $4x^2y$
B. $4x^2y - 6xy^2$
C. $10x^2y - 6xy^2$
D. None of the above

11. What is the additive inverse of $3x^2 - 2x + 4$?

A. $-3x^2 + 2x + 4$
B. $-3x^2 + 2x - 4$
C. $3x^2 + 2x - 4$
D. $3x^2 - 2x + 4$

12. Which of the following "laws" are incorrect?

A. $a^m \cdot a^n = a^{m+n}$, m and n are positive integers

B. $(a^m)^n = a^{mn}$, m and n are positive integers

C. $(ab)^m = ab^m$, m is a positive integer

D. None of the above

13. SIMPLIFY: $x^3 \cdot x^2 =$

A. x^6

B. x^5

C. x^9

D. None of the above

14. $(a^5)^2 =$

A. a^7

B. a^{10}

C. a^{25}

15. $b^{15} \div b^3$

A. b^5

B. b^{18}

C. b^{12}

16. $\dfrac{d^9}{d^3} =$

A. d^6

B. d^{12}

C. d^3

17. $(xy)^5 =$

A. xy^5

B. x^5y

C. x^5y^5

D. None of the above

18. $(5x^2y)^2 =$

A. $25x^4y$
B. $5x^4y^2$
C. $5x^4y$
D. $25x^4y^2$

19. $(3a^2)(2a^9) =$

A. $5a^{11}$
B. $5a^{18}$
C. $6a^{11}$
D. $6a^{18}$

20. $(-5g^2)^3 =$

A. $-125g^5$
B. $125g^5$
C. $-125g^6$
D. $-125g^8$

21. $(4x^2yz^3)(-2xy^3z^2)$

A. $8x^2y^3z^6$
B. $8x^3y^4z^5$
C. $-8x^2y^3z^6$
D. $-8x^3y^4z^5$

22. $(3st^2v)^2\ (-3s^2tv^3)^2$

A. $81s^6t^6v^6$
B. $-81s^6t^6v^6$
C. $81s^8t^8v^8$
D. None of the above

23. MULTIPLY: $3x^2(5-2x+7x^2)$

A. $15x^2 - 6x + 21x^4$
B. $15x^2 - 6x^3 + 21x^4$
C. $5x^2 - 6x^3 + 21x^4$

24. MULTIPLY: $\begin{array}{r} 5y^2-3y+2 \\ \underline{3y-4} \end{array}$

A. $15y^3 - 11y^2 + 18y - 8$

B. $15y^3 + 29y^2 + 18y - 8$

C. $15y^2 - 29y^2 + 18y - 8$

25. MULTIPLY: $(4x-3)(5x+1)$

A. $20x^2 - 11x - 3$

B. $20x^2 + 11x - 3$

C. $20x^2 - 19x - 3$

D. $20x^2 + 19x - 3$

26. MULTIPLY: $(x-4)^2$

A. $x^2 - 16$

B. $x^2 + 16$

C. $x^2 + 8x + 16$

D. $x^2 - 8x + 16$

27. MULTIPLY: $(2x+1)^2$

A. $4x^2 + 1$

B. $2x^2 + 1$

C. $4x^2 + 4x + 1$

D. $2x^2 + 4x + 1$

28. DIVIDE: $5x \overline{)\,10x^4+5x^3-5x^2+25x}$

A. $2x^3 + x^2 - x + 5$

B. $2x^4 + x^3 - x^2 + 5x$

C. $2x^3 + x^2 + 5$

D. $2x^4 + x^3 + 5x$

29. DIVIDE: $x-7\overline{)x^2-9x+14}$

A. $x+16+\frac{-98}{x-7}$

B. $x-16+\frac{126}{x-7}$

C. $x+2$

D. $x-2$

30. DIVIDE: $2x-5\overline{)6x^3+x^2-18x-33}$

A. $3x^2+8x+11+\frac{22}{2x-5}$

B. $3x^2+8x+11$

C. $3x^2-7x+9+\frac{-23}{2x-5}$

D. None of the above

31. DIVIDE: $6x^2-3\overline{)12x^5-12x^3+3x}$

A. $2x^3-3x$

B. $2x^3-3x+\frac{-6x}{6x^2-3}$

C. $2x^3-x+\frac{-6x}{6x^2-3}$

D. $2x^3-x$

32. COMPLETION: $a^0 =$ ________________, $a \neq 0$

33. COMPLETION: $a^1 =$ ________________.

34. The sum of three times a number and twice the number is decreased by 15, the result is 165. Determine the number.

Which expressions in the following list are not polynomials? Place the letter preceding the correct answer or answers on the answer sheet.

1. A. $5x^4 - 7x^3 + 32x^2 - 5x + 2$
   B. $\frac{1}{3}x^6 - 3x^2 + 9 - \frac{4}{x}$
   C. $5x - 3$
   D. 4
   E. $(x-1)(x+3)$
   F. $8x^2 - 12x + 3 - \frac{5}{x}$
   G. $\frac{x^2 - 5x + 2}{x - 3}$
   H. $3x^2y - 2xy^2 + 6y - \frac{3}{y}$

2. Which expression in the following list is a trinomial? Place the letter preceding the correct answer or answers on your answer sheet.
   A. $5x$
   B. $7x^2 - 2$
   C. $x^3 - 3x + 5$
   D. $7y^4 - 3y^2 + 6y - 2$

3. What is the degree of $5x^5 - 2x^2 + 6x + 3$?

4. What is the degree of $3x^2y^3 - 6xy^2 - 5x + 2y - 3$?

For problems 5 - 31, write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order

$$4x^3 - 3 + 4x^2 + 5x^4$$

   A. $-3 + 4x^2 + 4x^3 + 5x^4$
   B. $4x^3 - 3 + 4x^2 + 5x^4$
   C. $5x^4 + 4x^3 + 4x^2 - 3$

6. ADD: $(3x^2 - 5x + 11) + (8x - 4)$
   A. $6x^3 + 7$
   B. $3x^2 + 3x + 7$
   C. $3x^2 - 3x - 7$
   D. None of the above

7. ADD:

$$\begin{array}{r} 8x^3 - 2x^2 + 15x + 3 \\ \underline{4x^3 + 2x^2 + 7x + 9} \end{array}$$

A. $12x^3 + 4x^2 + 22x + 12$
B. $12x^3 - 4x^2 + 22x + 12$
C. $12x^3 + 22x + 12$

3. SUBTRACT: $(7x^2-6x-2) - (2x^2-8x+4)$

A. $5x^2 - 14x + 2$
B. $5x^2 + 2x - 6$
C. $5x^2 - 14x - 2$
D. $5x^2 + 2x + 6$

9. SUBTRACT: $(2x^3-4x^2-7) - (-2x^2+2x-3)$

A. $2x^3 - 2x^2 - 2x - 4$
B. $2x^3 - 6x^2 + 2x - 10$
C. $2x^3 - 2x^2 + 2x - 10$
D. $2x^3 - 6x^2 + 2x + 10$

10. SUBTRACT:

$$\begin{array}{r} 8x^2y - 3xy^2 \\ \underline{7x^2y - 5xy^2} \end{array}$$

A. $15x^2y - 3xy^2$
B. $x^2y - 8xy^2$
C. $x^2y + 2xy^2$
D. None of the above

11. What is the additive inverse of $3x^2 + 2x-3$?

A. $-3x^2 + 2x-3$
C. $3x^2 - 2x + 3$
B. $-3x^2 - 2x + 3$
D. $-3x^2 - 2x - 3$

12. Which of the following "laws" are incorrect?

A. $a^m \cdot a^n = a^{m+n}$, m and n are positive integers.

B. $(a^m)^n = a^{mn}$, m and n are positive integers.

C. $(ab)^m = a^m b^m$, m is a positive integer.

D. None of the above.

13. SIMPLIFY: $x^5 \cdot x^2 =$

A. x^7

B. x^{10}

C. x^{25}

D. None of the above

14. $(a^5)^3 =$

A. a^8

B. a^{125}

C. a^{15}

15. $b^{25} \div b^5 =$

A. b^{20}

B. b^5

C. b^{30}

16. $\frac{d^9}{d^6} =$

A. d^3

B. d^{15}

C. $d^{3/2}$

17. $(xy)^4 =$

A. xy^4

B. x^4y^4

C. x^4y

D. None of the above

18. $(3x^2y)^2 =$

A. $3x^4y$

B. $9x^4y^2$

C. $9x^4y$

19. $(3a^2)(4a^7) =$

A. $7a^9$

B. $7a^{14}$

C. $12a^{14}$

D. $12a^9$

20. $(-5g^2)^2 =$

A. $25g^4$

B. $(-5)^2g^4$

C. None of the above

D. Both A and B

21. $(4x^2yz^3)(-2xy^3z^2) =$

A. $-8x^2y^3z^6$

B. $-3x^3y^4z^5$

C. $-8x^5y^4z^5$

22. $(3st^2v)^2(-2s^2tv^3)^2 =$

A. $36s^6t^6v^8$

B. $-36s^6t^6v^8$

C. $36s^6t^6v^6$

D. $-36s^6t^6v^6$

23. MULTIPLY: $3x^2(3+3x-5x^2)$

A. $9x^2 + 9x^3 + 15x^4$

B. $9x^2 + 3x^3 - 15x^2$

C. $9x^2 + 9x^3 - 15x^4$

24. MULTIPLY:
$$\begin{array}{r} 5y^2-3y+2 \\ \underline{\quad 3y-5} \end{array}$$

A. $15y^3 + 16y^2 + 21y - 10$
B. $15y^3 - 34y^2 + 21y - 10$
C. $15y^3 - 16y^2 + 21y - 10$

25. MULTIPLY: $(4x-3)(6x+1)$
A. $24x^2 - 22x + 4$
B. $24x^2 - 22x - 3$
C. $24x^2 - 24x - 3$
D. $24x^2 - 14x - 3$

26. MULTIPLY: $(x-3)^2$
A. $x^2 + 9$
B. $x^2 - 9$
C. $x^2 + 6x + 9$
D. $x^2 - 6x + 9$

27. MULTIPLY: $(2x-3)^2$
A. $4x^2 - 6x + 9$
B. $4x^2 - 12x + 9$
C. $4x^2 + 9$
D. $4x^2 - 9$

28. DIVIDE: $5x\,\overline{)\,25x^4+15x^3-15x^2+25x}$

A. $5x^3 + 3x - 5$
B. $5x^3 - 3x + 5 + \frac{3}{5x}$
C. $5x^3 + 3x^2 - 3x + 5$
D. $5x^4 + 3x^3 - 3x^2 + 5x$

29. DIVIDE: $x-7 \overline{\big) x^2-10x+21}$

A. $x-3$

B. $x+3$

C. $x-2+\frac{2}{x-7}$

D. Can't be done

30. DIVIDE: $2x-5 \overline{\big) 2x^3-11x^2+17x-5}$

A. $x^2 + 3x + 1$

B. $x^2 - 3x + 16 + \frac{75}{2x-5}$

C. $x^2-3x + 1$

D. None of the above

31. DIVIDE: $6x^2-3 \overline{\big) 12x^5-12x^3+3x}$

A. $2x^3-x$

B. $2x^3 - 3x$

C. $2x^3 - x + \frac{-6x}{6x^2-3}$

D. $2x^3 - 3x + \frac{-6x}{6x^2-3}$

32. COMPLETION: $a^1 =$ __________

33. COMPLETION: $a^0 =$ __________

34. Twenty-one more than six times a number is 177. Determine the number.

UNIT VI Polynomial TEST C

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

1. Which expressions in the following list are not polynomials? Place the letter preceding the correct answer or answers on the answer sheet.

A. $3x$
B. 8
C. $\frac{1}{2}x^4 - 2x^2 + 7$
D. $y^3 - 7y^2 + 6y - 5$
E. $(x+4)(x-1)$
F. $5a^2b - 2ab^2 + 6b - 3$
G. $\dfrac{y^2+5y+2}{y-3}$
H. $7R^2 + 3R + 3 - \frac{2}{R}$

2. Which expression in the following list is a trinomial? Place the letter or letters preceding the correct answer or answers on the answer sheet.

A. $y^3 - y + 4$
B. $3x$
C. $5B^2 + C$
D. $R^4 + 3R^2 - R + 2$

3. What is the degree of $5x^4 - 3x^2 + 2x - 1$?

4. What is the degree of $4a^2b - 6ab^2 + 2a - 3b + 1$?

Write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order:

$$6A^3 + 1 + 3A^2 - A$$

A. $1 - A + 3A^2 + 6A^3$
B. $A + 1 + 3A^2 + 6A^3$
C. $6A^3 + 3A^2 - A + 1$
D. None of the above

6. ADD: $(4a-3b+5c) + (8a+5b-9c)$

A. $12a + 2b - 4c$
B. $12a + 8b - 14c$
C. $12a - 8b + 14c$
D. $4a + 2b - 4c$

7. ADD:

$$\begin{array}{r} 3x^3 - 2x^2 + 4x - 3 \\ \underline{8x^3 + 2x^2 + 7x + 9} \end{array}$$

A. $11x^3 - 4x^2 + 11x - 12$

B. $5x^3 - 4x^2 - 3x - 12$

C. $11x^3 + 11x + 6$

D. $-5x^3 - 3x - 12$

8. SUBTRACT: $(2a+b-c) - (a-b+c)$

A. $3a$

B. $3a + 2b - 2c$

C. $a + 2b - 2c$

D. $a + 2b + 2c$

9. SUBTRACT: $(7x^2-3xy^2) - (3x^2-3xy^2)$

A. $11x^2 - 6xy^2$

B. $4x^2 + 6xy^2$

C. $4x^2 - 6xy^2$

D. $4x^2$

10. SUBTRACT:

$$\begin{array}{r} 15x^2 - 3x + 9 \\ \underline{2x^2 + x - 3} \end{array}$$

A. $13x^2 - 4x + 12$

B. $13x^2 - 2x + 6$

C. $17x^2 - 2x + 6$

D. $17x^2 - 4x + 12$

11. What is the additive inverse of $5x^2 - x + 5$?

A. $-5x^2 - x - 5$

B. $5x^2 + x - 5$

C. $-5x^2 + x - 5$

D. $5x^2 + x + 5$

12. Which of the following "laws" are incorrect?

A. $b^m \cdot b^n = b^{m+n}$, m and n are positive integers.

B. $(b^m)^n = b^{mn}$, m and n are positive integers.

C. $(bx)^m = b^m x$, m is a positive integer.

Perform the indicated operations in problems 13 through 31.

13. $x^5 \cdot x^2$

A. x^3

B. x^{10}

C. None of these.

14. $(a^3)^2$

A. a^5

B. a

C. a^6

D. None of these.

15. $b^{18} \div b^7$

A. b^{25}

B. b^{11}

C. b^{126}

D. None of these.

16. $\frac{R^9}{R^3}$

A. R^{12}

B. R^6

C. R^3

D. None of these.

17. $(ab)^7$

A. a^7b

B. a^7b^7

C. ab^7

D. None of these.

18. $(3xy^2)^2$

A. $6x^2y^4$

B. $3x^2y^4$

C. $3xy^4$

D. None of these.

19. $(3x^2)(4x^7)$

A. $7x^9$

B. $12x^{14}$

C. $7x^5$

D. $12x^9$

20. $(-6S^2)^3$

A. $-216S^5$

B. $-216S^6$

C. $216S^6$

D. $36S^5$

21. $(3x^2yz^3)(-2xy^3z^2)$

A. $-6x^3y^4z^5$

B. $-6xy^2z$

C. $6xy^4z^5$

D. $6x^3y^4z^5$

22. $(2st^2v)(-3s^2tv^3)^2$

A. $-66s^3t^3v^4$ C. $-12s^3t^3v^4$

B. $36s^6t^6v^8$ D. None of these.

23. MULTIPLY: $3x^2(4+x-7x^2)$

A. $12x^2 + 3x^3 + 21x^2$ C. $7x^2 + 3x - 4x^2$

B. $12x^2 + 3x^3 - 21x^4$ D. None of these.

24. MULTIPLY:

$$\begin{array}{r} 7y^2 - y + 2 \\ \underline{\quad 2y - 9} \end{array}$$

A. $14y^3 - 58y^2 - 13y - 18$ C. $14y^3 - 61y^2 + 13y - 18$

B. $14y^3 - 54y^2 + 13y - 18$ D. None of these.

25. MULTIPLY: $(2x-3)(5x+1)$

A. $10x^2 - 17x + 3$ C. $7x^2 - 17x - 3$

B. $10x^2 - 17x - 3$ D. $10x^2 - 13x - 3$

26. MULTIPLY: $(y-3)^2$

A. $y^2 + 9$ C. $y^2 - 6y + 9$

B. $y^2 - 9$ D. $y^2 + 6y + 9$

27. MULTIPLY: $(2x + 3)^2$

A. $4x^2 + 9$ C. $4x^2 + 12x + 9$

B. $4x^2 + 6x + 9$ D. $4x^2 + 6$

28. DIVIDE: $5M \,/\overline{\,10M^4 - 15M^3 + 5M^2}$

A. $2M^3 - 3M^2 + M^2$ C. $2M^2 + 3M^2 + M$

B. $2M^3 - 3M^2 + M$ D. None of these.

29. DIVIDE: $x-7\overline{)x^2 - 15x+56}$

A. $x - 8$

C. $x - 22 + \frac{210}{x-7}$

B. $x + 8$

D. None of these.

30. DIVIDE: $2n-3\overline{)2n^3-5n^2 + 21n-14}$

A. $n^2 + 4n + 14$

C. $n^2 - n + 12 - \frac{22}{2n-3}$

B. $n^2 - n + 12 + \frac{22}{2n-3}$

D. None of these.

31. DIVIDE: $x^2-1\overline{)x^3+4-x-4x^2}$

A. $x^2 + 4x + 4$

C. $x + 4$

B. $x^2 + 4x - 4$

D. $x - 4$

32. COMPLETION: $x^0 =$ __________, $x = 0$

33. COMPLETION: $x^1 =$ __________

34. If the sum of three times a number and twice the number is decreased by 15, the result is 165. Find the number.

UNIT VI Polynomials TEST D

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

1. Which expression in the following list are not polynomials? Place the letter preceeding the correct answer or answers on the answer sheet.

A. $3x$

B. $4x^2 - 2x + 5 - \frac{3}{x}$

C. $3x^2y + 2xy^2 - 6y + 4$

D. $\frac{1}{5}x^2 - 2x + 4$

E. 7

F. $(x-7)(x+2)$

G. $\frac{x^2+7x-3}{x+1}$

H. $x^4 - 3x^3 + 7x - 1$

2. Which expression in the following list is a trinomial? Place the letter or letters preceeding the correct answer or answers on the answer sheet.

A. $4x^3 + 7x + 3$

B. $2x$

C. $7y^2 + 6$

D. $9x^3 + 7x^2 - 3x + 9$

3. What is the degree of $3x^5 - 2x^4 + 7x - 3$?

4. What is the degree of $4x^3y + 6x^2y - 3xy + 9x$?

In problems 5-31, write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order:

$$4x^2 + 4x^3 + 5x - 3$$

A. $4x^3 - 3 + 4x^2 + 5x$

B. $-3 + 5x + 4x^2 + 4x^3$

C. $4x^3 + 4x^2 + 5x - 3$

6. ADD: $(5x^2-6x+9) + (7x-4)$

A. $5x^2 - 13x - 13$

B. $5x^2 + x + 5$

C. $6x^3 + 5$

D. None of the above

7. ADD:
$$\begin{array}{r} 8x^3 - 2x^2 + 5x - 3 \\ \underline{3x^3 + 2x^2 + 7x + 9} \end{array}$$

A. $11x^3 + 12x + 6$

B. $11x^3 - 4x^2 + 12x + 6$

C. $5x^3 - 2x - 12$

D. $5x^3 + 12x + 6$

8. SUBTRACT: $(4x^2-3x-2) - (2x^2-7x+3)$

A. $6x^2 - 10x + 1$

B. $6x^2 + 4x ,- 5$

C. $2x^2 - 10x + 1$

D. $2x^2 + 4x - 5$

9. SUBTRACT: $(2x^3-4x^2-7) - (2x^2-2x+3)$

A. $2x^3 - 2x^2 - 2x -4$

B. $2x^3 - 6x^2 + 2x - 10$

C. $-4x^2 - 2x - 10$

D. $-4x^2 + 2x - 4$

10. SUBTRACT:
$$\begin{array}{r} 7x^2y - 3xy^2 \\ \underline{3x^2y - 3xy^2} \end{array}$$

A. $10x^2y - 6xy^2$

B. $4x^2y - 6xy^2$

C. $4x^2y$

D. None of the above

11. What is the additive inverse of $3x^2 - 2x + 4$?

A. $-3x^2 + 2x - 4$

B. $-3x^2 + 2x + 4$

C. $3x^2 + 2x - 4$

D. $3x^2 - 2x + 4$

12. Which of the following "laws" are incorrect?

A. $a^m \cdot a^n = a^{m+n}$, where m and n are positive integers.

B. $(ab)^m = ab^m$, m is a positive integer.

C. $(a^m)^n = a^{mn}$, m and n are positive integers.

13. SIMPLIFY: $x^3 \cdot x^2 =$

A. x^6

B. x^9

C. x^5

14. $(a^5)^2$

A. a^{10}

B. a^7

C. a^{25}

15. $b^{15} \div b^3 =$

A. b^5

B. b^{18}

C. b^{12}

16. $\frac{d^9}{d^3} =$

A. d^{12}

B. d^6

C. d^3

17. $(xy)^5$ =

A. xy^5
B. x^5y^5
C. x^5y
D. None of the above.

18. $(5x^2y)^2$ =

A. $5x^4y^2$
B. $5x^4y$
C. $25x^4y^2$
D. $25x^4y$

19. $(3a^2)(2a^9)$ =

A. $5a^{11}$
B. $5a^{18}$
C. $6a^{18}$
D. $6a^{11}$

20. $(-5g^2)^3$ =

A. $-125g^6$
B. $-125g^8$
C. $-125g^5$
D. $125g^5$

21. $(4x^2yz^3)(-2xy^3z^2)$

A. $8x^2y^3z^6$
B. $-8x^3y^4z^5$
C. $-8x^3y^4z^6$
D. $8x^3y^4z^5$

22. $(3xt^2v)^2(-3x^2tv^3)^2$

A. $-81x^6t^6v^6$
B. $81s^8t^8v^8$
C. $81s^6t^6v^6$
D. None of the above

23. MULTIPLY: $3x^2(5-2x+7x^2)$

A. $15x^2 - 6x + 21x^4$

B. $15x^2 - 6x^3 + 21x^4$

C. $5x^2 - 6x^3 + 21x^4$

24. MULTIPLY:

$$\begin{array}{r} 5y^2 - 3y + 2 \\ \underline{3y - 4} \end{array}$$

A. $15y^3 - 11y^2 + 18y - 8$

B. $15y^3 + 29y^2 + 18y - 8$

C. $15y^3 - 29y^2 + 18y - 8$

25. MULTIPLY: $(4x-3)(5x+1)$

A. $20x^2 + 19x - 3$

B. $20x^2 - 19x - 3$

C. $20x^2 + 11x - 3$

D. $20x^2 - 11x - 3$

26. MULTIPLY: $(x-4)^2$

A. $x^2 + 8x + 16$

B. $x^2 - 8x + 16$

C. $x^2 - 16$

D. $x^2 + 16$

27. MULTIPLY: $(2x+1)^2$

A. $4x^2 + 4x + 1$

B. $2x^2 + 4x + 1$

C. $4x^2 + 1$

D. $2x^2 + 1$

28. DIVIDE: $5x\,\overline{)10x^4 + 5x^3 - 5x^2 + 5x}$

A. $2x^4 + x^3 + 5x$

B. $2x^3 + x^2 + 5$

C. $2x^3 + x^2 - x + 1$

D. $2x^4 + x^3 - x^2 + 5x$

29. DIVIDE: $x-7 \overline{)\, x^2 - 9x + 14}$

A. $x + 2$

B. $x - 2$

C. $x + 16 + \frac{-98}{x-7}$

D. $x - 16 + \frac{126}{x-7}$

30. DIVIDE: $2x-5 \overline{)\, 6x^3 + x^2 - 18x - 33}$

A. $3x^2 + 8x + 11 + \frac{22}{2x-5}$

B. $3x^2 - 7x + 9 + \frac{-23}{2x-5}$

C. $3x^2 + 8x + 11$

D. None of the above

31. DIVIDE: $6x^2-3 \overline{)\, 12x^5 - 12x^3 + 3x}$

A. $2x^3 - 3x + \frac{-6x}{6x^2-3}$

B. $2x^3 - x + \frac{-6x}{6x^2-3}$

C. $2x^3 - 3x$

D. $2x^3 - x$

32. COMPLETION: $a^1 =$ ______

33. COMPLETION: $a^0 =$ ______, $a = 0$

34. The sum of 3 consecutive integers is 48. Determine the numbers.

UNIT VI Polynomials Test A B C D

NAME ________________________ SECTION ____________

TEACHER ________________________ DATE ____________

SCORE ________________________ PERIOD ____________

1. ____________ 18. ____________

2. ____________ 19. ____________

3. ____________ 20. ____________

4. ____________ 21. ____________

5. ____________ 22. ____________

6. ____________ 23. ____________

7. ____________ 24. ____________

8. ____________ 25. ____________

9. ____________ 26. ____________

10. ____________ 27. ____________

11. ____________ 28. ____________

12. ____________ 29. ____________

13. ____________ 30. ____________

14. ____________ 31. ____________

15. ____________ 32. ____________

16. ____________ 33. ____________

17. ____________ 34. ____________

UNIT VII Special Products and Factoring Test A

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1. Which of the following numbers is prime? Write the letter preceding the number of the correct answer or answers on your answer sheet

   A. 1 C. 2

   B. 9 D. 15

2. Factor 72 completely into powers of primes.

3. Give the second factor: $18x^2y^4 = 9xy(\quad)$

4. Find the GCF of 12 and 18.

5. Find the GCF of $2x^2y^2$ and $6x^6yz$.

Factor completely all polynomials from number 6 through number 16.

6. $36x + 12y - 24$

7. $25x^3 - 15x^2 - 5x$

8. $x^2 - 16$

9. $a^2 + 8a + 16$

10. $b^2 + 4b - 12$

11. $6c^2 - c - 2$

12. $x^3 - 3x^2 + 7x - 21$

13. $25x^2 - 81y^2$

14. $2a^3 + 20a^2 + 50a$

15. $2x^2 - 8$

16. $-x^2 + 2x - 1$

17. Name the additive inverse of $4x^2 - 5x - 7$

18. COMPLETION: If a and b are numbers and $(a)(b) = 0$ but $a \neq 0$, then b = ________________.

19. MULTIPLY: $-1\ (x^2 - 3x + 2) =$ ____________________.

Solve each of the equations from number 20 through number 29. Write the solutions to them on your answer sheet.

20. $(x - 2)(x + 1) = 0$

21. $y(y - 2) = 0$

22. $(2a + 1)(a - 3) = 0$

23. $y^2 - 25 = 0$

24. $y^2 - 6y + 9 = 0$

25. $x^2 + 3x = 10$

26. $0(a - 2) = 0$

27. $0(x - 7) = 1$

28. A man traveled 4 hours at x miles per hour, then at $(20 + x)$ miles per hour for 3 hours. Represent the total distance traveled.

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided for this purpose. Place all answers on the answer sheet. Do not spend too much time on any one problem.

1 Which of the following numbers is not prime? Write the letter of the correct answer or answers on your answer sheet.

A. 3 C. 2

B. 15 D. 5

2. Factor 68 completely into powers of primes.

3. Give the second factor: $45x^2y^5 = 9xy\ (\quad)$

4. Find the GCF of 24 and 18.

5. Find the GCF of $3x^3y^4$ and $6x^4y^4z$

Factor completely all polynomials from number 6 thru number 16

6. $9x - 18y + 27$

7. $x^2 - 25$

8. $3x^3 - 15x^2 - 42x$

9. $a^2 + 12a + 36$

10. $b^2 + b - 12$

11. $6d^2 + 3d - 3$

12. $x^3 - 7x^2 + 3x - 21$

13. $9x^2 - 64y^2$

14. $3a^3 + 21a^2 - 48a$

15. $3x^2 - 27$

16. $-x^2 + x + 6$

17. COMPLETION: If a and b are numbers and $ab = 0$ and $b \neq 0$, then $a =$ __________.

18. MULTIPLY: $-1\,(2x^2 - 5x - 2)$

19. Name the additive inverse of $-6x^2 + 5x + 4$.

Solve each of the equations from number 20 through 27. Write the solutions on your answer sheet.

20. $(a - 3)(a + 4) = 0$

21. $(2a - 1)(a - 4) = 0$

22. $t(t - 3) = 0$

23. $x^2 - 16 = 0$

24. $x^2 - 10x + 25 = 0$

25. $a^2 + 5a = -6$

26. $0(t + 3) = 0$

27. $0(a - 3) = 1$

28. The sum of 3 consecutive integers is 39. Determine the three integers.

UNIT VII Special Products and Factoring Test C

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1. Which of the following numbers is prime? Write the letter preceding the number of the correct answer or answers on your answer sheet.

   A. 6

   B. 5

   C. 1

   D. 9

2. Factor 84 completely into powers of primes.

3. Give the second factor: $16a^2b^4 = 8ab(\ \ )$

4. Find the GCF of 12 and 15.

5. Find the GCF of $3a^2b^2$ and $6a^6bc$

Factor completely all polynomials from number 6 through 16

6. $18x + 12y - 24$

7. $20x^3 - 15x^2 + 5x$

8. $x^2 - 81$

9. $y^2 + 11y + 16$

10. $r^2 + 7r - 30$

11. $15y^2 - y - 2$

12. $a^3 - 3a^2 + 5a - 15$

13. $36r^2 - 81s^2$

14. $x^3 - 2x^2 + x$

15. $4c^2 - 16$

16. $-a^2 + 2a - 1$

17. Name the additive inverse of $6a^2 - 3a - 1$.

18. COMPLETION: If a and b are numbers and $(a)(b) = 0$, but $b \neq 0$, then a = ________________.

19. MULTIPLY: $-1(y^2 - 5y + 3)$

Solve each of the equations from number 20 through number 29. Write the solutions to them on your answer sheet.

20. $(a + 1)(a - 3) = 0$

21. $x(x - 10) = 0$

22. $(2a + 3)(a - 1) = 0$

23. $x^2 - 81 = 0$

24. $y^2 - 5x - 6 = 0$

25. $r^2 + 5r = 6$

26. $0(x + 5) = 0$

27. $0(a - 8) = 1$

28. Two jet transports start at the same time from the same airport. One flies due east at 620 miles per hour. The other flies directly west at 560 miles per hour. In how many hours will they be 3540 miles apart.

UNIT VII Special Products and Factoring Test D

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1. Which of the following numbers is prime? Write the letter of the correct answer or answers on your answer sheet.

   A. 7
   B. 5
   C. 4
   D. 6

2. Factor 56 completely into powers of primes.

3. Give the second factor: $28x^2y^5 = 7xy(\quad)$

4. Find the GCF of 16 and 24.

5. Find the GCF of $3x^2y^3$ and $12x^5y^2z$.

Factor completely all polynomials from number 6 through number 16.

6. $25x + 5y - 10z$

7. $36x^3 + 24x^2 + 12x$

8. $x^2 - 36$

9. $y^2 + 6y + 9$

10. $b^2 + 5b - 14$

11. $6c^2 + c - 2$

12. $x^3 - 5x^2 + 2x - 10$

13. $49x^2 - 81y^2$

14. $4a^3 + 40a^2 + 100a$

15. $3x^2 - 27$

16. $-x^2 - 2x - 1$

17. Name the additive inverse of $-9x^2 + 3x - 6$.

18. MULTIPLY: $-1(x^2 + 6x - 7) =$ ____________

19. COMPLETION: If x and y are numbers and $(x)(y) = 0$ but $x \neq 0$, then $y =$ ________________.

Solve each of the equations from number 20 through number 27. Write the solutions to them on your answer sheet.

20. $(x + 6)(x - 7) = 0$

21. $y(y - 3) = 0$

22. $(3a + 2)(a - 3) = 0$

23. $y^2 - 81 = 0$

24. $y^2 + 10y + 25 = 0$

25. $x^2 - 5x = 36$

26. $0(a + 7) = 1$

27. $0(a - 8) = 0$

28. A number increased by three is equal to twice that, same number decreased by 1. Determine the number.

UNIT VII Special Products and Factoring Test A B C D

NAME ______________________ SECTION ____________

TEACHER ______________________ DATE ____________

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Unit VIII

FRACTIONS

Part I
Test A

DIRECTIONS: Do not write on this test paper. Do all work on the scratch paper provided to you. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In problems 1 through 5, determine the values of the variable for which the fraction is not defined. If there are no exclusions, write "none".

1. $\frac{5}{x}$

2. $\frac{7}{x-3}$

3. $\frac{2x+1}{x+2}$

4. $\frac{7x-2}{4}$

5. $\frac{x^2+2}{x^2-4}$

6. COMPLETION: An algebraic fraction is the indicated ________________ of two real numbers, polynomials, or combinations of these.

7. COMPLETION: In the fraction $\frac{3}{4}$, 3 is called the ____________________ (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms. If the fraction is already in simplest form, write "done" on your answer sheet.

8. $\frac{36}{42}$

9. $\frac{20a^2b}{25ab^2}$

10. $\frac{80x^2yz}{15xy^2z}$

11. $\frac{x+3}{x^2-9}$

12. $\dfrac{x^2 + 2x + 1}{x^2 - x - 2}$

13. $\dfrac{ab}{a + b}$

In problems 14 through 18, give the products reduced to lowest terms.

14. $\dfrac{x^2}{3} \cdot \dfrac{6}{xy} =$ ________________

15. $(7xy)\left(\dfrac{15x}{14y}\right) =$ ________________

16. $\dfrac{7(x - y)}{5} \cdot \dfrac{8x}{y - x} =$ ________________

17. $\dfrac{a^2 - b^2}{m + n} \cdot \dfrac{m^2 - n^2}{a + b} =$ ________________

18. $\dfrac{a^2 + 5a + 4}{a + 4} \cdot \dfrac{a + 5}{a^2 + 6a + 5} =$ ________________

In problems 19 through 24 give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\dfrac{5}{6} \div \dfrac{-3}{4} =$ ________________

20. $\dfrac{15x}{16y} \div 5x =$ ________________

21. $7x^2y \div \dfrac{5x}{2y} =$ ________________

22. $\dfrac{15a^2}{7b} \div \dfrac{25a^3}{14b^2} =$ ________________

23. $\dfrac{3x + 6}{x^2 - y^2} \div \dfrac{x^2 + 5x + 6}{x + y} =$ ________________

24. $\dfrac{3a}{3a + 2} \cdot \dfrac{6a + 4}{4a} \div \dfrac{a + 2}{2} =$ ________________

25. Jim and Joe earned a total of $36. Joe earned $3 more than one-half of what Jim earned. How much did each earn?

Unit VIII FRACTIONS Part I
Test B

DIRECTIONS: Do not write on the test paper. Do all work on scrap paper and place final answers on the answer sheet. Do NOT spend too much time on any one problem.

In problems 1 through 5, determine the values of the variable for which the fraction is not defined. If there are no exclusions, write "none".

1. $\frac{1}{x + 1}$

2. $\frac{3}{x - 2}$

3. $\frac{2x + 1}{x}$

4. $\frac{x^2 + 4}{x^2 - 25}$

5. $\frac{3x - 7}{9}$

6. Completion: An algebraic fraction is the indicated ________________ of two real numbers, polynomials or combinations of the same.

7. Completion: In the fraction $\frac{3}{4}$, 4 is called the ________________ (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms. If the fraction is already in simplest form, write "done" on your answer sheet.

8. $\frac{64}{72}$

9. $\frac{15ab^2}{20a^2b}$

10. $\frac{90xy^2z^2}{20xyz}$

11. $\frac{x + 5}{x^2 - 25}$

12. $\frac{x^2 + 4x + 4}{x^2 - x - 6}$

13. $\frac{2a}{2 + b}$

In problems 14 through 18, give the product or quotient reduced to lowest terms.

14. $\frac{xy}{6} \cdot \frac{3}{x^2}$

15. $(3xy) \left(\frac{4x}{9y}\right)$

16. $\frac{3(a - b)}{8} \cdot \frac{8x}{9(b - a)}$

17. $\frac{x - y}{a^2 - b^2} \cdot \frac{a - b}{x^2 - y^2}$

18. $\frac{c^2 + 3c + 2}{c + 1} \cdot \frac{c + 1}{c^2 + 5c + 4}$

In problems 19 through 24, give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\frac{5}{9} \div \frac{-3}{5}$

20. $\frac{18x}{21y} \div 6x$

21. $7x^2y \div \frac{5x}{2y}$

22. $\frac{21a^2}{9b} \div \frac{7a^3}{3b^2}$

23. $\frac{4x + 20}{x^2 - 4y^2} \div \frac{x + 5}{x - 2y}$

24. $\frac{x^2 - 1}{x^2} \cdot \frac{x}{x - 1} \div \frac{x + 1}{5}$

25. A rectangle is 2 yards longer than it is wide. The area of the rectangle is 99 square yards. Find its dimensions.

Unit VIII

FRACTIONS

Part I
Test C

DIRECTIONS: Do not write on this test paper. Do all work on the scratch paper provided to you. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In problems 1 through 5, determine the value of the variable for which the fraction is not defined. If there are no exclusions, write "none".

1. $\frac{8}{x - 2}$

2. $\frac{3x + 1}{x + 4}$

3. $\frac{5}{x}$

4. $\frac{x^2 + 5}{x^2 - 9}$

5. $\frac{7y + 1}{4}$

6. Completion: In the fraction $\frac{7}{9}$, 7 is the ________________ (numerator, denominator).

7. True or False: An algebraic fraction is the indicated quotient of two real numbers, polynomials or combinations of these.

Reduce the fractions in problems 8 through 13 to lowest terms. If the fraction is already in simple form, write "done".

8. $\frac{38}{50}$

9. $\frac{36a^2b^3}{16ab^2}$

10. $\frac{15x^4y^2z}{45x^6yz^3}$

11. $\frac{7ab}{14a + b}$

12. $\frac{x - 7}{x^2 - 49}$

13. $\frac{c^2 + 6c + 9}{c^2 - 9}$

In problems 14 through 18, give the products reduced to lowest terms. Assume that there are no divisions by zero.

14. $(8\ x\ y) \cdot (\frac{3y}{4x})$

15. $\frac{a^3}{4} \cdot \frac{12}{ab}$

16. $\frac{9(a - b)}{4} \cdot \frac{5}{b - a}$

17. $\frac{a^2 + a}{2} \cdot \frac{6}{a^2 - 1}$

18. $\frac{x^2 - 5x + 6}{x - 2} \cdot \frac{x + 3}{x^2 - 9}$

In problems 19 through 24 give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\frac{3}{7} \div \frac{-12}{5}$

20. $\frac{21x}{16y} \div 3z$

21. $18x^3y \div \frac{4x}{3y}$

22. $\frac{24a^3}{7b} \div \frac{8a^2}{21b^3}$

23. $\frac{x^2 + 4x + 3}{x + 2} \div \frac{x^2 + x - 6}{x + 2}$

24. $\frac{x^2 + 10x + 25}{x + 10} \cdot \frac{10}{x^2 + 15x + 50} \div \frac{x + 5}{x + 10}$

25. An object is thrown from a plane at an altitude of 26,000 feet. If the object falls at a rate of 52 feet per second, how long will it take for the object to reach the ground?

Unit VIII

FRACTIONS

Part I
Test D

DIRECTIONS: Do not write on this test paper. Do all work on the scratch paper provided to you. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In problems 1 through 5, determine the values of the variable for which the fraction is not defined. If there are no exclusions, write "none".

1. $\frac{10}{x}$

2. $\frac{5}{y - 3}$

3. $\frac{3x + 1}{x + 2}$

4. $\frac{5x - 3}{5}$

5. $\frac{x^2 + 1}{x^2 - 4}$

6. Completion: An algebraic fraction is the indicated ____________________ of two real numbers, polynomials, or combination of these.

7. Completion: In the fraction $\frac{5}{12}$, 12 is called ____________________ (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms. If the fraction is already in simplest form, write "done" on your answer sheet.

8. $\frac{24}{42}$

9. $\frac{10x^2y}{15xy^2}$

10. $\frac{60a^2bc}{25abc^2}$

11. $\frac{x + 2}{x^2 - 4}$

12. $\frac{p^2 - 4p + 3}{p^2 + 3p - 4}$

13. $\frac{xy}{x - y}$

In problems 14 through 18, give the products reduced to lowest terms.

14. $\frac{y^2}{2} \cdot \frac{8}{xy}$

15. $(6 x z)(\frac{15z}{12x})$

16. $\frac{5(a - b)}{7} \cdot \frac{8a}{b - a}$

17. $\frac{x^2 - y^2}{w + v} \cdot \frac{w^2 - v^2}{x + y}$

18. $\frac{a^2 - 12a + 32}{a + 4} \cdot \frac{a^2 - 16}{a - 8}$

In problems 19 through 23, give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\frac{5}{8} \div \frac{-3}{4}$

20. $\frac{12x}{14y} \div 6x$

21. $8x^2y \div \frac{5x}{4y}$

22. $\frac{15z^2}{7w} \div \frac{14w^2}{25z^3}$

23. $\frac{3a + 6}{a^2 - b^2} \div \frac{a^2 + 5a + 6}{a + b}$

24. $\frac{x^2 + 2x + 1}{3x} \cdot \frac{2x + 6}{6x^3} \div \frac{x + 1}{12x^3}$

25. A rectangle is 8 feet longer than it is wide. Its area is 105 square feet. Find its dimensions.

UNIT VIII **Fractions** PART I A B C D

NAME ______________________ SECTION ______________

TEACHER ______________________ DATE ______________

SCORE ______________________ PERIOD ______________

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UNIT VIII

Fractions

PART II
Test A

DIRECTIONS: Do not write on this test paper. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In Problems 1 through 10, give the sum or difference reduced to lowest terms. Assume that there are no divisions by zero.

1. $\frac{5}{9} + \frac{2}{9} =$ ________________

2. $\frac{x}{5} - \frac{3}{5} =$ ________________

3. $\frac{a}{b} - \frac{2 - 3a}{b} =$ ________________

4. $\frac{5}{7} + \frac{3}{4} =$ ________________

5. $\frac{2a}{5} + \frac{3a}{4} =$ ________________

6. $\frac{a^2}{a - 2} - \frac{4}{a - 2} =$ ________________

7. $\frac{10x}{x + 5} + \frac{x^2 + 25}{x + 5} =$ ________________

8. $\frac{7}{a^2 b} - \frac{3}{ab^2} =$ ________________

9. $\frac{x}{x^2 - 81} + \frac{4}{x + 9} =$ ________________

10. $\frac{x - 1}{x^2 - 2x - 8} + \frac{x + 2}{x^2 + x - 2}$

11. SIMPLIFY: $\dfrac{\frac{5x}{6}}{\frac{10x}{12y}}$

12. SIMPLIFY: $\dfrac{\frac{a}{b} + 1}{\frac{a}{b} - 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\frac{x}{5} + \frac{x}{4} = \frac{3}{4}$

15. $\frac{2m - 1}{5} - \frac{2 - m}{5} = 1$

16. $\frac{x}{4} = \frac{x - 2}{5}$

17. $\frac{2c}{3} + 1 < \frac{3c}{4}$

18. $\frac{3y}{5} - \frac{2 - 3y}{2} > 5$

19. $\frac{5}{x} + \frac{3}{4} = \frac{7}{x}$

20. $\frac{9}{a + 2} = \frac{6}{a + 2}$

21. $\frac{60}{a^2 - 36} + 1 = \frac{5}{a - 6}$

DIRECTIONS: Do not write on this test paper. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In Problems 1 to 10, give the sum or difference reduced to lowest terms? Assume that there are no divisions by zero.

1. $\frac{4}{7} + \frac{2}{7}$

2. $\frac{x}{8} - \frac{5}{8}$

3. $\frac{b}{c} - \frac{3 - 2b}{c}$

4 $\frac{4}{9} + \frac{2}{5}$

5. $\frac{3a}{5} + \frac{5a}{6}$

6. $\frac{x^2}{x - 3} - \frac{9}{x - 3}$

7. $\frac{12x}{x + 6} + \frac{x^2 + 36}{x + 6}$

8. $\frac{5}{a^2b} + \frac{2}{a^2b}$

9. $\frac{x}{x^2 - 49} + \frac{3}{x + 7}$

10. $\frac{x - 2}{x^2 - 3x - 4} + \frac{x + 2}{x^2 - x - 2}$

11. SIMPLIFY: $\frac{\frac{4x}{5}}{\frac{8x}{10y}}$

12. SIMPLIFY: $\dfrac{\dfrac{A}{B} - 1}{\dfrac{A}{B} + 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\frac{x}{4} + \frac{x}{5} = \frac{3}{4}$

15. $\frac{3m - 2}{5} - \frac{3 - m}{5} = 1$

16. $\frac{x}{5} = \frac{x - 3}{6}$

17 $\frac{3c}{5} + 1 < \frac{3}{4}c$

18. $\frac{8y}{5} - \frac{6 - 5y}{2} > 8$

19. $\frac{6}{x} + \frac{4}{5} = \frac{5}{x}$

20. $\frac{8}{a - 3} = \frac{5}{a - 3}$

21. $\frac{40}{a^2 - 16} + 1 = \frac{5}{a - 4}$

UNIT VIII **Fractions** PART II Test D

DIRECTIONS: Do not write on this test paper. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In Problems 1 through 10, give the sum or difference reduced to lowest terms. Assume that there are no divisions by zero.

1. $\frac{5}{9} + \frac{2}{9}$

2. $\frac{x}{8} - \frac{5}{8}$

3. $\frac{a}{b} - \frac{2 - 3a}{b}$

4. $\frac{4}{9} + \frac{2}{5}$

5. $\frac{2a}{5} + \frac{3a}{4}$

6. $\frac{x^2}{x - 3} - \frac{9}{x - 3}$

7. $\frac{10x}{x + 5} + \frac{x^2 + 25}{x + 5}$

8. $\frac{5}{a^2b} + \frac{2}{a^2b}$

9. $\frac{x}{x^2 - 81} + \frac{4}{x + 9}$

10. $\frac{x - 2}{x^2 - 3x - 4} + \frac{x + 2}{x^2 - x - 2}$

11. SIMPLIFY: $\dfrac{\frac{5x}{6}}{\frac{10x}{12y}}$

12. SIMPLIFY: $\dfrac{\frac{A}{B} - 1}{\frac{A}{B} + 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\frac{x}{4} + \frac{x}{5} = \frac{3}{4}$

15. $\frac{2y - 1}{5} - \frac{2 - y}{5} = 1$

16 $\frac{z}{5} = \frac{z - 3}{6}$

17. $\frac{2d}{3} + 1 < \frac{3d}{4}$

18. $\frac{8x}{5} - \frac{6 - 5x}{2} > 8$

19. $\frac{5}{x} + \frac{3}{4} = \frac{7}{x}$

20. $\frac{8}{a + 3} = \frac{5}{a + 3}$

21. $\frac{60}{a^2 - 36} + 1 = \frac{5}{a - 6}$

UNIT VIII

Fractions

PART II
Test D

DIRECTIONS: Do not write on this test paper. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In Problems 1 to 10, give the sum or difference reduced to lowest terms. Assume that there are no divisions by zero.

1. $\frac{4}{7} + \frac{2}{7}$

2. $\frac{x}{5} - \frac{3}{5}$

3. $\frac{b}{c} - \frac{3 - 2b}{c}$

4. $\frac{5}{7} + \frac{3}{4}$

5. $\frac{3a}{5} + \frac{5a}{6}$

6. $\frac{a^2}{a - 2} - \frac{4}{a - 2}$

7. $\frac{12x}{x + 6} + \frac{x^2 + 36}{x + 6}$

8. $\frac{7}{a^2b} - \frac{3}{ab^2}$

9. $\frac{x}{x^2 - 49} + \frac{3}{x + 7}$

10. $\frac{x - 1}{x^2 - 2x - 8} + \frac{x + 2}{x^2 + x - 2}$

11. SIMPLIFY: $\frac{\frac{4x}{5}}{\frac{8x}{10y}}$

12. SIMPLIFY: $\dfrac{\frac{m}{n} + 1}{\frac{m}{n} - 1}$

13. What is the ratio in lowest terms of 4 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14 $\frac{x}{5} + \frac{x}{4} = \frac{3}{4}$

15. $\frac{3m - 2}{5} - \frac{3 - m}{5} = 1$

16. $\frac{x}{4} = \frac{x - 2}{5}$

17. $\frac{3c}{5} + 1 < \frac{3}{4}c$

18. $\frac{3y}{5} - \frac{2 - 3y}{2} > 5$

19. $\frac{6}{x} + \frac{4}{5} = \frac{5}{x}$

20. $\frac{9}{a - 2} = \frac{6}{a - 2}$

21. $\frac{40}{a^2 - 16} + 1 = \frac{5}{a - 4}$

UNIT VIII

Fractions

PART II
Test A B C D

NAME ______________________________ SECTION __________

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DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

Fill in each numbered blank with the letter preceding the word from the following list that makes each sentence correct.

A. coordinate axes
B. quadrant
C. ordered pair
D. coordinates
E. ordinate
F. origin
G. abscissa
H. line
I. point
J. variable

The major horizontal and vertical lines in a Cartesian Axis System are called ______(1)______. The point where they intersect is called the ______(2)______ of the system. Each point in the plane is located by attaching two numbers to it called the ______(3)______ of the point. These two numbers are usually written so that the order is important. Hence, the pair is called a(n) ______(4)______. The first number of the pair is called the ______(5)______ of the point, and the second number is called the ______(6)______ of the point. The plane is divided into four principal regions by the major lines. Each of these regions is called a(n) ______(7)______.

8. Write the letter of the correct answer on the answer sheet. The point A(-7, 3) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

9. Write the letter of the correct answer on the answer sheet. The point B(-7, 0) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

10 TRUE or FALSE: The point C(5, 0) lies on the x-axis

11 TRUE or FALSE: The point I(0, 0) lies in the y-axis

12 TRUE or FALSE: The point P(2, a) lies in quadrant IV if $a < 0$.

13 COMPLETION: Consider the expression x_2^3 The number ______________ is the subscript

Solve each of the equations in numbers 14 through 16 for y in terms of x

14 $2y = 3x - 1$

15 $2x - 2y + 1 = 0$

16 $7x + 3y - 4 = 0$

17 Consider the equation $5x - 3y + 2 = 0$ If $x = 4$, then $y =$ ______________

18 Graph the following points and label them properly. Use the Cartesian System given on your answer sheet All must be plotted properly

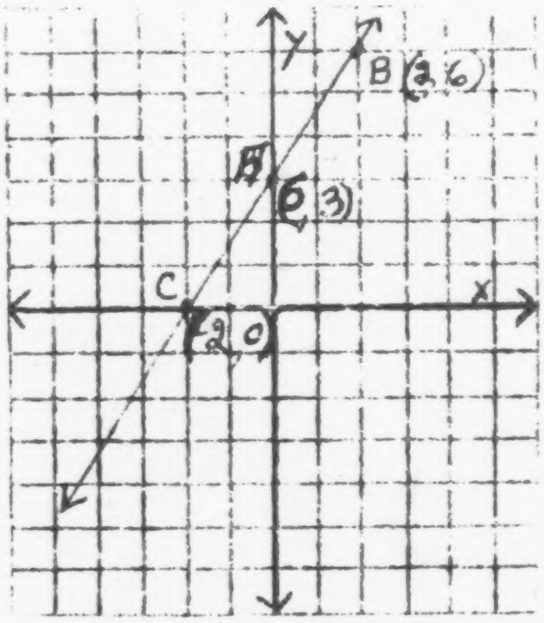
A.	A(-3, 2)	C.	C(0, -2)
B.	B(4, 0)	D.	D(-2, -3)

19. Using the Cartesian System given on your answer sheet, graph the equation:

$$x - 2y + 1 = 0$$

Use the chart method. Complete the chart that appears on your answer sheet

20 Examine the graph given below. What is the y-intercept of the line?



21. What is the y-intercept of the graph of the line whose equation is $3x - 4y + 6 = 0$?

22. Graph the line whose equation is $x = -2$ in the given Cartesian System.

23. Graph the line whose equation is $y = 2$ on the given Cartesian System.

24. COMPLETION: ________________ is the equation of the x-axis.

25. Which one or ones of the following equations is (are) linear. Write the letter preceding the correct answer(s) on the answer sheet.

A. $y = 3x - 2$

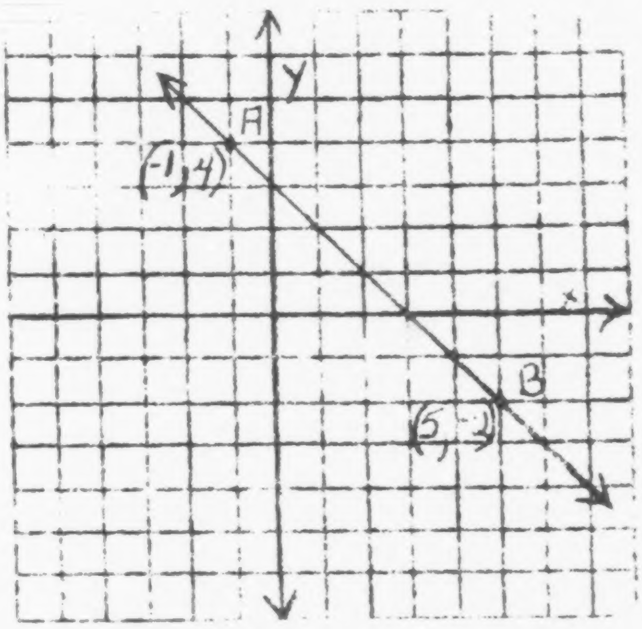
B. $y = 2x^2$

C. $y = 5x^2 - 4x + 3$

D. $2x - 3y + 6 = 0$

E. None of these.

26. What is the slope of the line given by the graph below?



27. What is the slope of the line $\overleftrightarrow{AB}$ if A has the coordinates $(-3, -2)$ and B has the coordinates $(5, 7)$?

28. Which of the lines defined by the equations below have no slope defined for it? Write the letter of the correct answer on your answer sheet.

A. $x = 4$

B. $y = 2$

C. $2x - 3y + 5 = 0$

D. All of the above have slopes defined.

UNIT IX Graphs and Sentences in Two Variables PART I
Test B

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

Fill in each numbered blank with the number preceding the word from the following list that makes each sentence correct.

A. Ordinate
B. Coordinate axes
C. Coordinates
D. Line
E. Ordered pairs
F. Variable
G. Origin
H. Point
I. Quadrant
J. Abscissa

The major horizontal and vertical lines in the Cartesian Axis system are called ______(1)______. The point where they intersect is called the ______(2)______. Each point in the plane is located by attaching two numbers to it called the ______(3)______ of the point. These two numbers are usually written so that the order is important. Hence, the pair is called a(n) ______(4)______. The first number of the pair is called the ______(5)______ of the point, and the second number is called the ______(6)______ of the point. The plane is divided into four principal regions by the major lines. Each of these regions is called a(n) ______(7)______.

8. Write the letter of the correct answer on the answer sheet. The point (7, -3) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

9. Write the letter of the correct answer on the answer sheet. The point (6, 0) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

10. TRUE or FALSE: The point (5, 0) lies on the y-axis.

11. TRUE or FALSE: The point I(0, 0) lies on the x-axis.

12. TRUE or FALSE: The point P(a, 1) lies in quadrant II if $a < 0$.

13. COMPLETION: In x_1^3 the number ____________ is the subscript.

Solve each of the equations in numbers 14-16 for y in terms of x.

14. $4y = 3x - 1$

15. $3x + 2y = 0$

16. $8x + 3y = 0$

17. Consider the equation $5x - 3y + 2 = 0$. If $x = 2$, then $y =$ ____________.

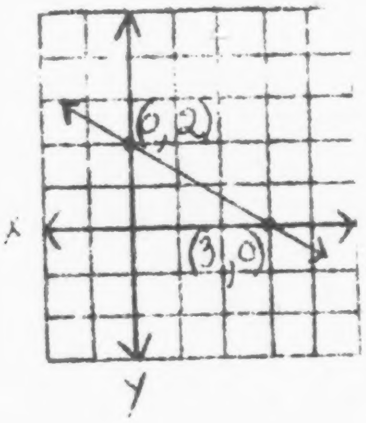
18. Graph the following points and label them properly. Use the Cartesian System on your answer sheet. ALL must be plotted correctly.

    A. A(3, -2) C. C(0, -3)

    B. B(6, 0) D. D(-2, -3)

19. Using the Cartesian System given on your answer sheet, graph the the equation $2x + y + 3 = 0$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the x-intercept of the line?



21. What is the y-intercept of the graph of the line whose equation is $2x + 7y + 14 = 0$?

22. Graph the line whose equation is $x = -3$ in the given system.

23. Graph the line whose equation is $y = 4$ on the given Cartesian System.

24. COMPLETION: ____________________ is the equation of the y-axis.

25. Which of the following are linear? Write the letter preceding the correct answer on the answer sheet.

A. $y = 4x + 2$

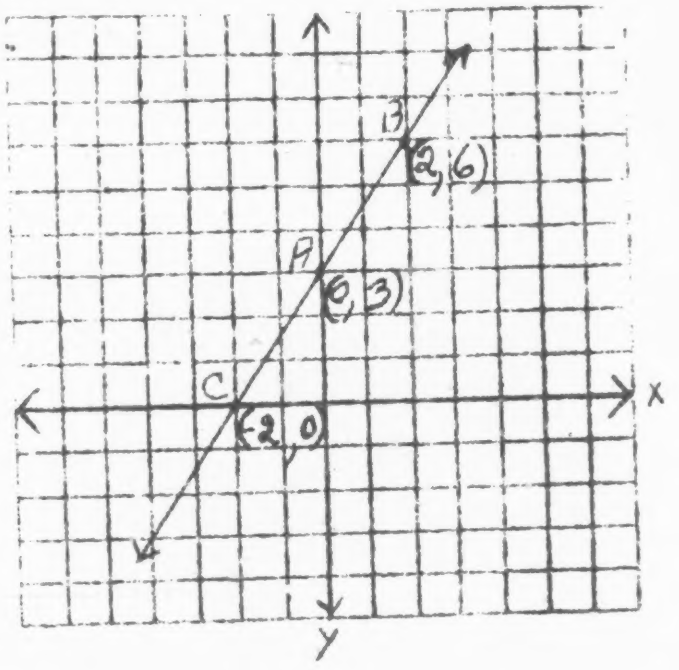
B. $y = 5x^2$

C. $y = 6x^2 + 4x + 3$

D. $3x - 4y + 6 = 0$

E. None of these.

26. What is the slope of the line given by the graph below?



27. What is the slope of line $\overleftrightarrow{AB}$ if A has the coordinates $(3, -2)$ and B has the coordinates $(5, -7)$?

28. Which of the lines defined by the equations below have no slope defined for it? Write the letter of the correct answer on the answer sheet.

A. $x = 6$

B. $y = 5$

C. $3x - 5y + 5 = 0$

D. All of the above have slopes defined.

UNIT IX Graphs and Sentences in Two Variables PART I
Test C

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

Fill in each numbered blank with the letter preceding the word from the following list that makes each sentence correct.

A. ordered pair

B. quadrant

C. coordinate axes

D. coordinates

E. origin

F. abscissa

G. variable

H. point

I. ordinate

J. line

The major horizontal and vertical lines in a Cartesian Axis System are called ____(1)____. The point where they intersect is called the ____(2)____ of the system. Each point in the plane is located by attaching two numbers to it called the ____(3)____ of the point. These two numbers are usually written so that the order is important. Hence, the pair is called a(n) ____(4)____. The first number of the pair is called the ____(5)____ of the point and the second number is called the ____(6)____ of the point. The plane is divided into four principal regions by the major lines. Each of these regions is called a(n) ____(7)____.

8. Write the letter of the correct answer on the answer sheet. The point A(8, -2) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

9. Write the letter of the correct answer on the answer sheet. The point B(0, -5) lies in quadrant:

A. I
B. II
C. III
D. IV
E. None

10. TRUE or FALSE: The point C(-3, 0) lies on the x-axis.

11. TRUE or FALSE: The point I(0, 0) lies in the x-axis.

12. TRUE or FALSE: The point P(-3,a) lies in quadrant II if $a < 0$.

13. COMPLETION: Consider the expression x_3^2. The number ______________ is the subscript.

Solve each of the equations in numbers 14 through 16 for y in terms of x.

14. $3y = 2x + 1$

15. $3x - 3y + 1 = 0$

16. $10x + 3y - 4 = 0$

17. Consider the equation $5x - 3y + 2 = 0$. If $x = 5$, then $y =$ ______________.

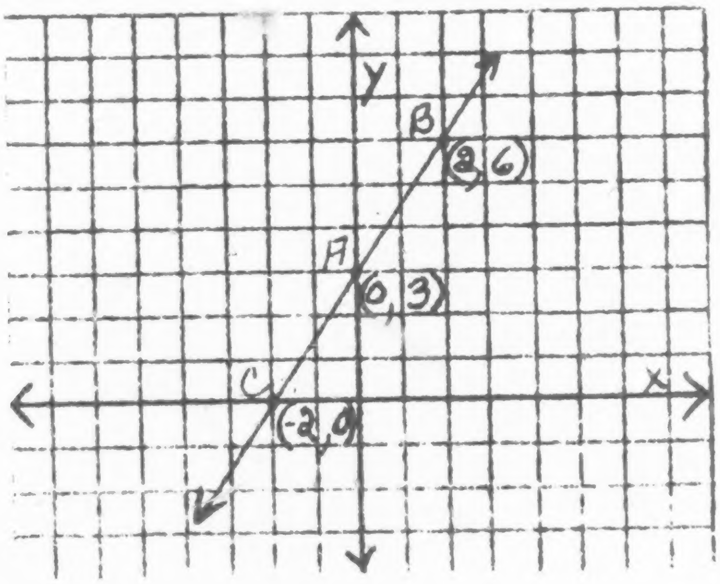
18. Graph the following points and label them properly. Use the Cartesian System given on your answer sheet. All must be plotted properly.

    A. A(-5, 1) C. C(0, -3)

    B. B(3, 0) D. D(-1, -2)

19. Using the Cartesian System given on your answer sheet, graph the equation $2x - y - 1 = 0$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the y-intercept of the line?



21. What is the y-intercept of the graph of the line whose equation is $2x - 3y + 5 = 0$?

22. Graph the line whose equation is $y = -3$ in the given system.

23. Graph the line whose equation is $x = 3$ on the given Cartesian System.

24. COMPLETION: ____________________ is the equation of the y-axis.

25. Which one or ones of the following equations is (are) linear? Write the letter preceding the correct answer(s) on the answer sheet.

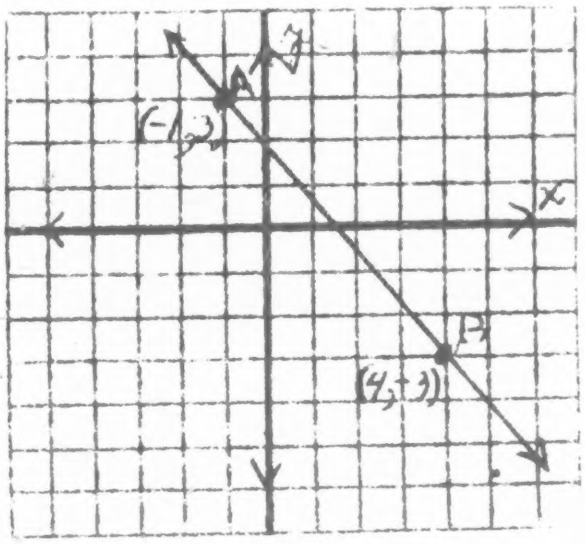
A. $y = 2x + 1$

B. $y = 5x^2 - 4x + 3$

C. $2x - 3y + 4 = 0$

D. $y = 6x^2$

26. What is the slope of the line given by the graph below?



27. What is the slope of the line $\overline{AB}$ if A has the coordinates (-4, -2) and B(5, 8) ?

28. Which of lines defined by the equations below has no slope defined for it? Write the letter of the correct answer on your answer sheet.

A. $y = 2$

B. $2x - 3y + 5 = 0$

C. $x = 4$

D. All of the above have slopes.

UNIT IX Graphs and Sentences in Two Variables PART I
Test D

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

Fill in each numbered blank with the letter preceding the word from the following list that makes each sentence correct.

A. origin

B. coordinate axes

C. variable

D. ordered pair

E. abscissa

F. point

G. quadrant

H. ordinate

I. line

J. coordinates

The major horizontal and vertical lines in a Cartesian Axis System are called ______(1)______. The point where they intersect is called the ______(2)______ of the system. Each point in the plane is located by attaching two numbers to it called the ______(3)______ of the point. These two numbers are usually written so that the order is important. Hence, the pair is called a(n) ______(4)______. The first number of the pair is called the ______(5)______ of the point, and the second number is called the ______(6)______ of the point. The plane is divided into four principal regions by the major lines. Each of these regions is called a(n) ______(7)______ .

8. Write the letter of the correct answer on the answer sheet. The point B(3, 0) lies in quadrant:

A. I

B. II

C. III

D. IV

E. None

9. Write the letter of the correct answer on the answer sheet. The point A(-3, -5) lies in quadrant:

A. I

B. II

C. III

D. IV

E. None

10. TRUE or FALSE: The point C(0, 3) lies on the x-axis.

11. TRUE or FALSE: The point A(0, 0) lies on the y-axis.

12. TRUE or FALSE: The point P(5, a) lies in quadrant II if $a < 0$.

13. COMPLETION: Consider the expression x_4^7. The number ____________ is the subscript.

In Problems 14-16, solve each of the equations for y in terms of x.

14. $5y = 6x - 1$

15. $3x - 2y + 5 = 0$

16. $9x + 4y - 9 = 0$

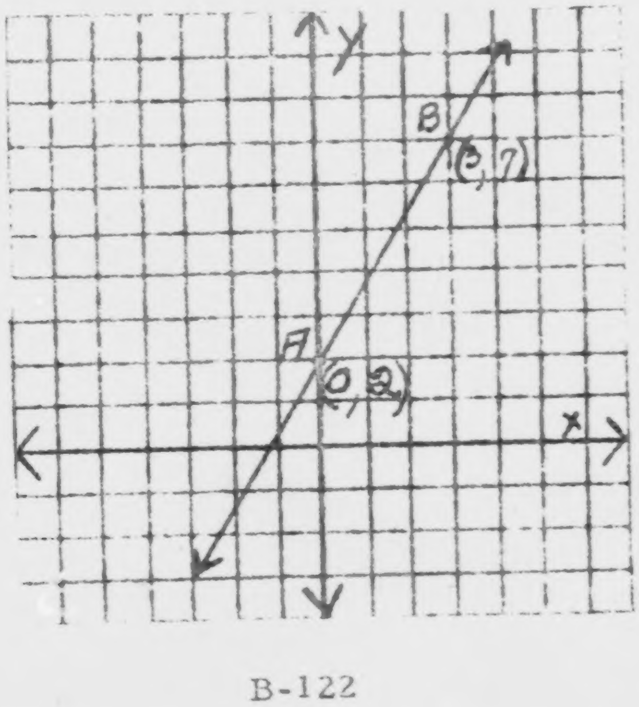
17. Consider the equation $7x - 2y + 5 = 0$. If $x = 3$, then $y =$ ____________.

18. Graph the following points and label them properly. Use the Cartesian System given on your answer sheet. All must be plotted properly.

A.	A(-6, -5)	C.	C(0, 2)
B.	B(-3, 4)	D.	D(-5, 0)

19. Using the Cartesian System given on your answer sheet, graph the equation $x + 2y = 3$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the y-intercept of the line?



21. What is the y-intercept of the graph of the line whose equation is $7x - 5y + 4 = 0$?

22. Graph the line whose equation is $y = -3$ on the given Cartesian System.

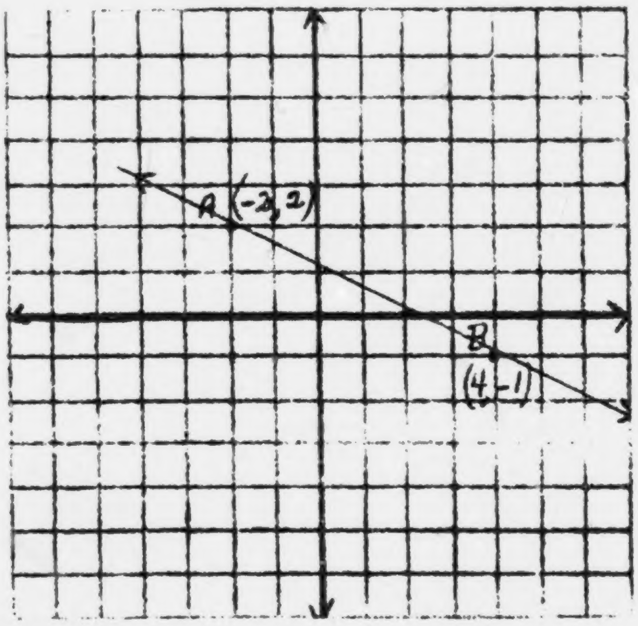
23. Graph the line whose equation is $x = 2$ on the given Cartesian System.

24. TRUE or FALSE: ____ $x = 0$ is the equation of the y-axis.

25. Which one or ones of the following equations is (are) linear? Write the letter of the correct answer(s) on the answer sheet.

A. $y = 4x + 2$
C. $2y + 3x = 1$
B. $y = 3x^2 - 1$
D. None of these.

26. What is the slope of the line given by the graph below?



27. What is the slope of the line $\overleftrightarrow{AB}$ if A has the coordinates A(4, -2) and B has the coordinates (6, 8) ?

28. Which of the lines defined by the equations below have no slope defined for it? Write the letter(s) of the correct answer(s) on your answer sheet.

A. $y = 5$
C. $x = -2$
B. $3x + 2y = 7$
D. All of the above have slopes.

UNIT IX Graphs and Sentences in Two Variables PART I
Test A B C D

NAME SECTION

TEACHER DATE

SCORE PERIOD

1.
2.
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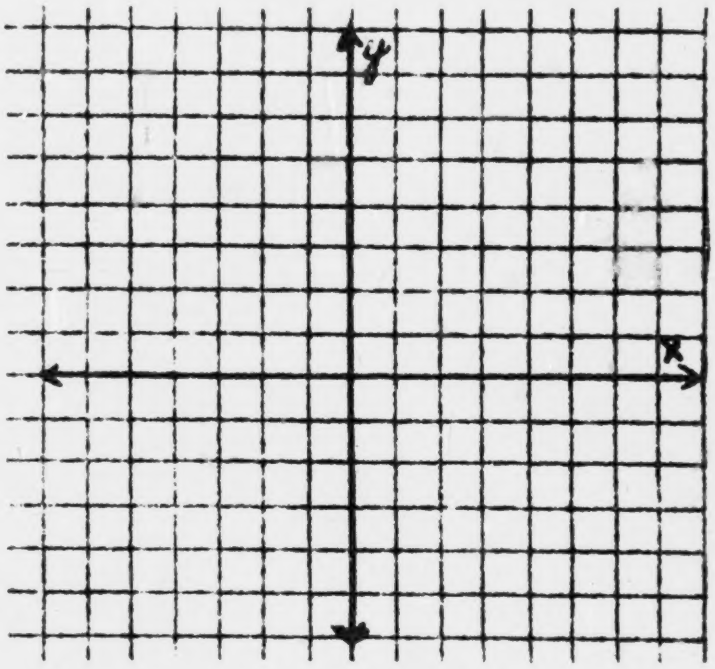

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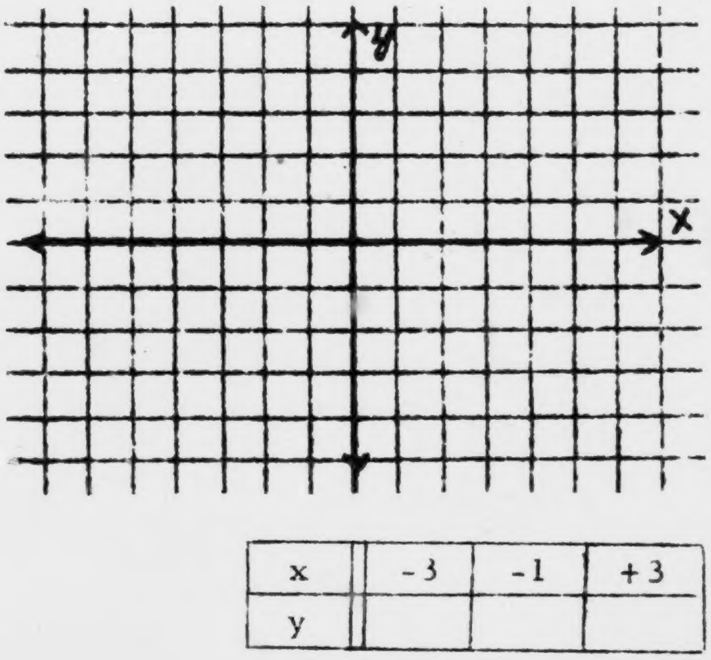
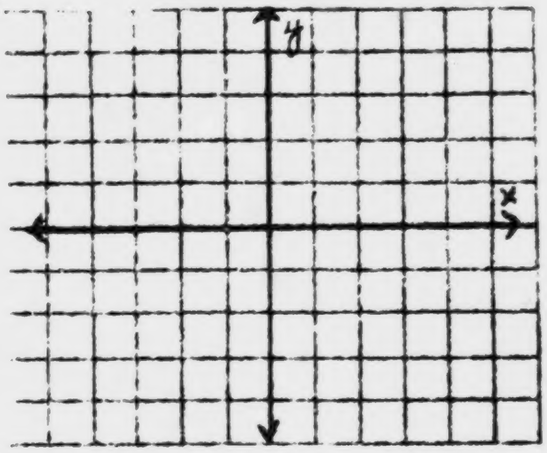


x	-3	-1	+3
y			

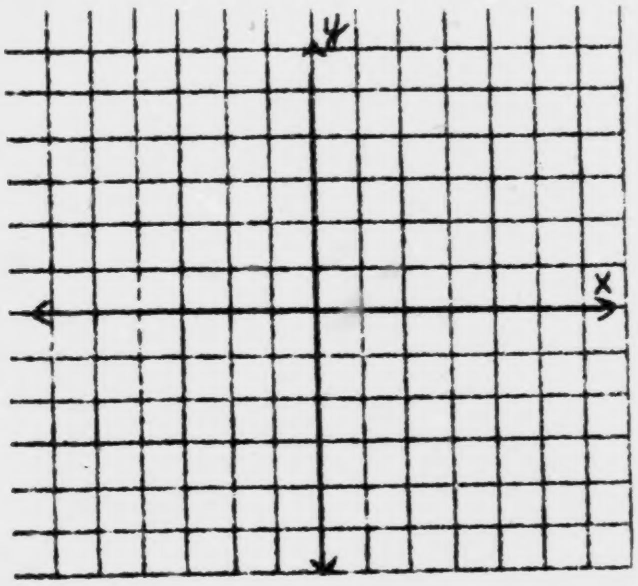
20. ______________________________

21. ______________________________

22.



23.



24. ______________________________

25. ______________________________

26. ______________________________

27. ______________________________

28. ______________________________

UNIT IX Graphs and Sentences in Two Variables PART II
Test A

DIRECTIONS: Place all answers on the answer sheet provided to you. Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Do not spend too much time on any one problem.

1. COMPLETION: If a line runs downhill from left to right, its slope is ________________ (negative, positive).

2. Plot the line determined by the points C(-3, 2) and D(2, 0) on the given system.

3. What is the slope of the line whose equation is $y = 3x - 1$?

4. What is the slope of the line whose equation is $3x + 2y - 6 = 0$?

5. Plot the line through the point A(2, -1) with slope $m = \frac{2}{3}$ on the given system.

6. Plot the line whose y-intercept is -2 and whose slope is -1 on the given system.

7. Plot the line whose equation is $y = 3x - 2$ on the given system.

8. Plot the line whose equation is $2x - 3y + 6 = 0$ on the given system.

9. A line has a slope of -2 and a y-intercept of +1. Write its equation.

10. A line has a slope of +3 and goes through A(2, 1). Write its equation.

11. A line is determined by the two points A(-3, 2) and B(2, -3). Write its equation.

12. Graph the inequality $x \geq 2$ on the given system.

13. Graph the inequality $y \leq 1$ on the given system.

14. Graph the inequality $x - y < 1$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same given set of axes and determine the common solution, if one exists.

$$5x - y - 9 = 0$$

$$x + y - 3 = 0$$

17. Consider the system of equations:

$$y = -2x + 1 \quad \text{and} \quad 5x + 3y = 5$$

Find the common solution to the system, if one exists.

18. Find the common solution to the following system of equations, if one exists.

$$2x - 5y = 4$$
$$3x + 4y = -17$$

19. EVALUATE: $\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -2 & 3 \\ -1 & 5 \end{vmatrix}$

21. Consider the system:

$$5x - 2y + 3 = 0$$
$$2x - 7y + 9 = 0$$

The expression:

$$\frac{\begin{vmatrix} 5 & -3 \\ 2 & -9 \end{vmatrix}}{\begin{vmatrix} 5 & -2 \\ 2 & -7 \end{vmatrix}}$$

gives the__________(x or y) value of the common solution.

UNIT IX Graphs and Sentences in Two Variables PART II
Test B

DIRECTIONS: Place all answers on the answer sheet provided to you. Do not write on this test booklet. Do all scratchwork on the paper provided for this purpose. Do not spend too much time on any one problem.

1. COMPLETION: If a line runs uphill from left to right, its slope is ________________ (positive, negative).

2. Plot the line determined by the points C(-3,1) and D(3,0) on the given system.

3. What is the slope of the line whose equation is $y = 5x - 1$?

4. What is the slope of the line whose equation is $4x + 3y - 6 = 0$?

5. Plot the line through the point A(3,-1) with slope $m = \frac{3}{4}$ on the given system.

6. Plot the line whose y-intercept is -3 and whose slope is -1.

7. Plot the line whose equation is $y = 2x - 3$.

8. Plot the line whose equation is $2x - 3y + 6 = 0$.

9. A line has a slope of -2 and a y-intercept of 2. Write its equation.

10. A line has a slope of 3 and goes through the point C(3,1). Write its equation.

11. A line is determined by the two points A(-3,2) and B(2,-3). Write its equation.

12. Graph the inequality $x \geq 3$ on the given system.

13. Graph the inequality $y \leq -1$ on the given system.

14. Graph the inequality $x - y < 1$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same given set of axes and determine the common solution if one exists.

$$5x - y - 9 = 0$$

$$2x + y - 5 = 0$$

17. Consider the system of equations $y = -2x + 7$ and $2x + 3y = 13$. Find the common solution if one exists.

18. Find the common solution to the following system if one exists.

$$2x - 5y = 4$$
$$3x + 4y = -17$$

19. EVALUATE: $\begin{vmatrix} 7 & 4 \\ 2 & 8 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -3 & 3 \\ -1 & 4 \end{vmatrix}$

21. Consider the system:

$$7x + 2y + 3 = 0$$
$$2x + 7y + 9 = 0$$

The expression:

$$\frac{\begin{vmatrix} 7 & -3 \\ 2 & -9 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 7 \end{vmatrix}}$$

gives the____________ (x or y) value of the common solution.

UNIT IX Graphs and Sentences in Two Variables PART II
Test C

DIRECTIONS: Place all answers on the answer sheet provided to you. Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Do not spend too much time on any one problem.

1. COMPLETION: If a line runs downhill from left to right, its slope is ____________________ (negative, positive).

2. Plot the line determined by the points C(-1, 3) and D(2, -2) on the given system.

3. What is the slope of the line whose equation is $y = -2x + 5$?

4. What is the slope of the line whose equation is $5x + 3y + 9 = 0$?

5. Plot the line through the point B(-2, 3) with a slope of $\frac{1}{3}$ on the given system.

6. Plot the line whose y-intercept is 2 and whose slope is -2 on the given system.

7. Plot the line whose equation is $y = 2x + 4$ on the given system.

8. Plot the line whose equation is $3x - 4y + 8 = 0$ on the given system.

9. A line has a slope of 4 and a y-intercept of -3. Write its equation.

10. A line has a slope of -2 and goes through C(1, 3). Write its equation.

11. A line is determined by the two points C(0, -2) and D(3, 4). Write its equation.

12. Graph the inequality $y < -1$ on the given system.

13. Graph the inequality $x \geq 3$ on the given system.

14. Graph the inequality $2x - y \geq 2$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same given set of axes and determine the common solution, if one exists.

$$2x + y - 1 = 0$$

$$x + y - 3 = 0$$

17. Consider the system of equations: $2x - 3y = 1$ and
$4y = 3x - 7$

Find the common solution to the system, if one exists.

18. Find the common solution to the following system of equations, if one exists.

$3x + 2y = 5$ and

$x - y = 5$

19. EVALUATE: $\begin{vmatrix} 4 & -2 \\ 0 & 3 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -6 & -1 \\ 4 & 3 \end{vmatrix}$

21. Consider the system: $2x + y - 1 = 0$ and
$5x + 3y - 5 = 0$

The expression:

$$\frac{\begin{vmatrix} 1 & 1 \\ 5 & 3 \end{vmatrix}}{\begin{vmatrix} 2 & 1 \\ 5 & 3 \end{vmatrix}}$$

gives the ____________ (x or y) value of the common solution.

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1. COMPLETION: If a line runs uphill from left to right, its slope is ________________ (positive, negative).

2. Plot the line determined by the points C(-3, 4) and D(4, 0) on the given system.

3. What is the slope of the line whose equation is $y = 7x - 1$?

4. What is the slope of the line whose equation is $3x + 5y - 8 = 0$?

5. Plot the line through the point A(3, -1) with slope $m = \frac{4}{3}$ on the given system.

6. Plot the line whose y-intercept is -2 and whose slope is -2.

7. Plot the line whose equation is $y = 4x - 2$.

8. Plot the line whose equation is $4x - 3y + 9 = 0$.

9. A line has slope $m = -3$ and y-intercept, -5. Write its equation.

10. A line has slope $m = 5$ and contains the point A(4, 1). Write its equation.

11. A line is determined by the two points A(-5, 2) and B(-2, 0). Write its equation.

12. Graph the inequality $x \geq 1$ on the given system.

13. Graph the inequality $y \leq 3$ on the given system.

14. Graph the inequality $x - y < 3$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same set of axes and determine the common solution if one exists.

$$2x + y - 5 = 0$$
$$5x - y - 2 = 0$$

17. Consider the system of equations $y = -2x + 9$ and $2x + 3y = 19$. Find the common solution if one exists.

18. Find the common solution to the following system if one exists.

$$\begin{aligned} 2x - 5y &= 6 \\ 3x - 4y &= 9 \end{aligned}$$

19. EVALUATE: $\begin{vmatrix} 7 & 8 \\ 3 & 5 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -4 & 4 \\ 2 & -3 \end{vmatrix}$

21. Consider the system: $\begin{aligned} 7x + 2y + 3 &= 0 \\ 2x + 7y + 9 &= 0 \end{aligned}$

The expression $$\frac{\begin{vmatrix} -3 & 2 \\ -9 & 7 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 7 \end{vmatrix}}$$

gives the ______________ (x or y) value of the common solution.

UNIT IX

Graphs and Sentences in Two Variables

PART II
Test A B C D

NAME ______________________ SECTION ______________

TEACHER ______________________ DATE ______________

SCORE ______________________ PERIOD ______________

1. ______________________

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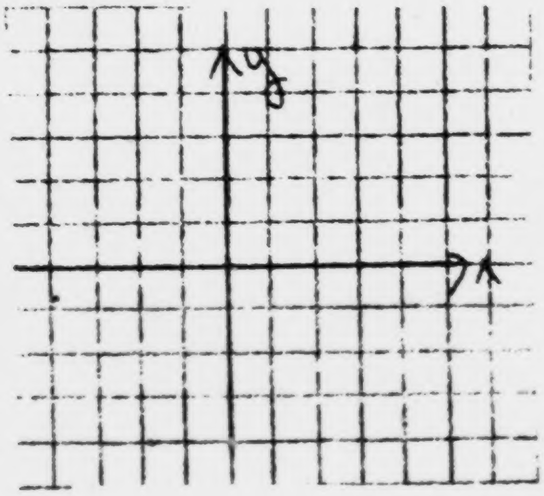

3. ______________________

4. ______________________

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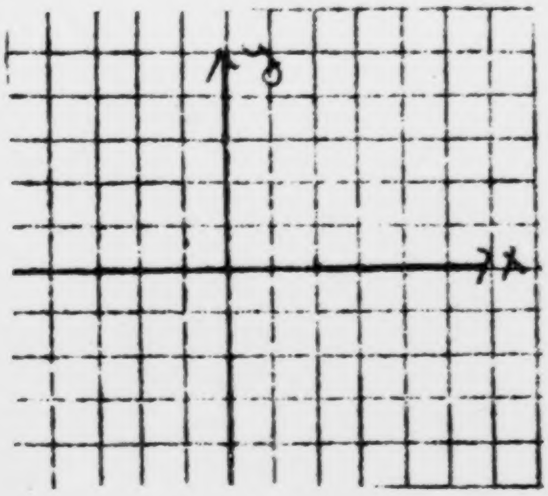

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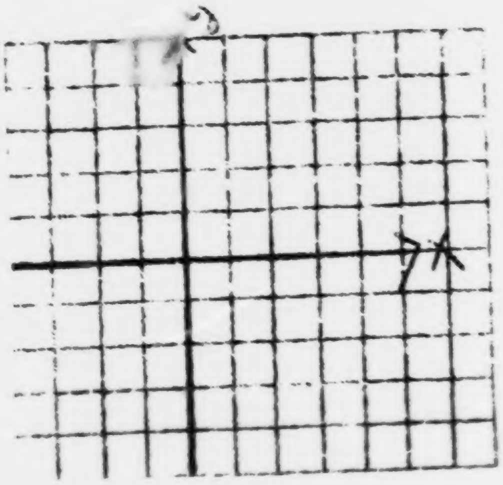

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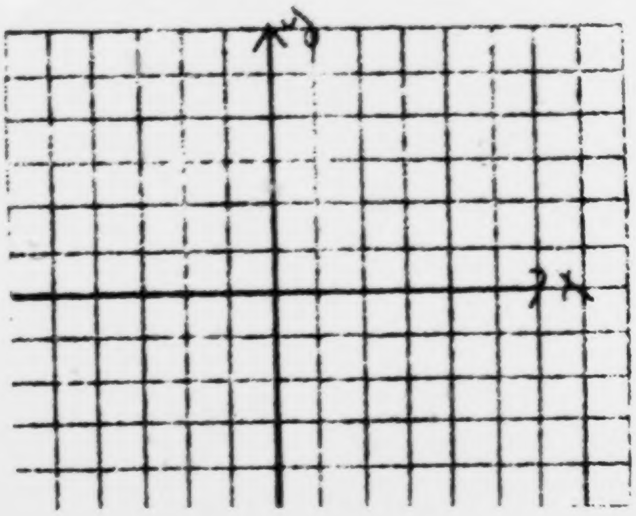

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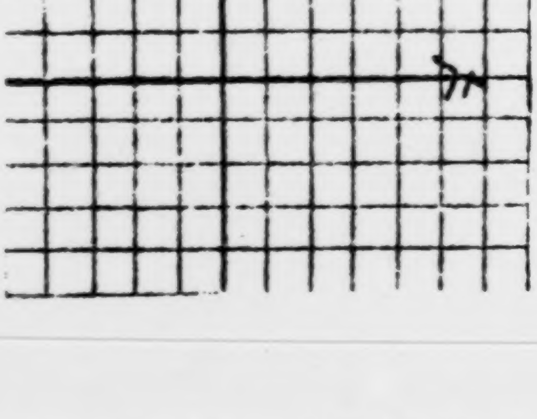

9. ______________________

10. ______________________

11. ______________________

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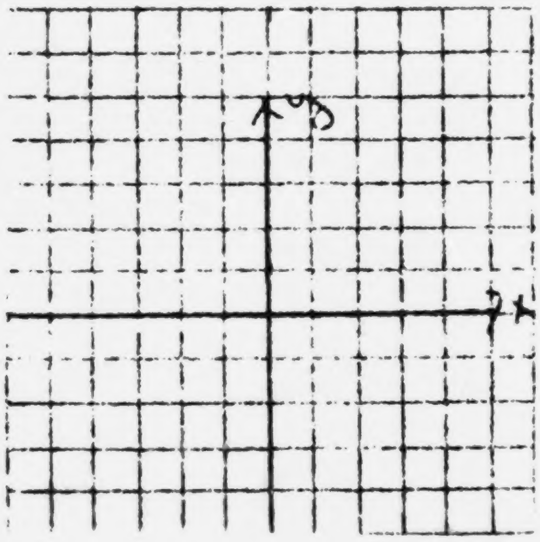
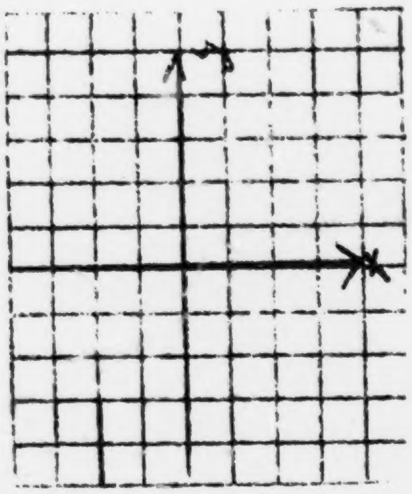


13.



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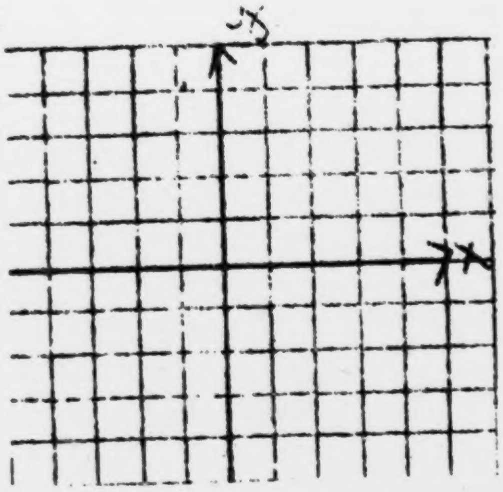

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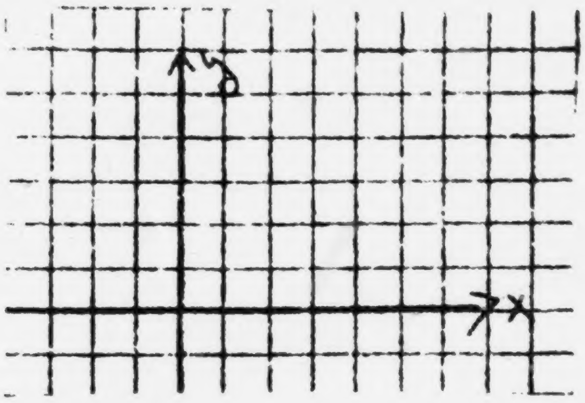
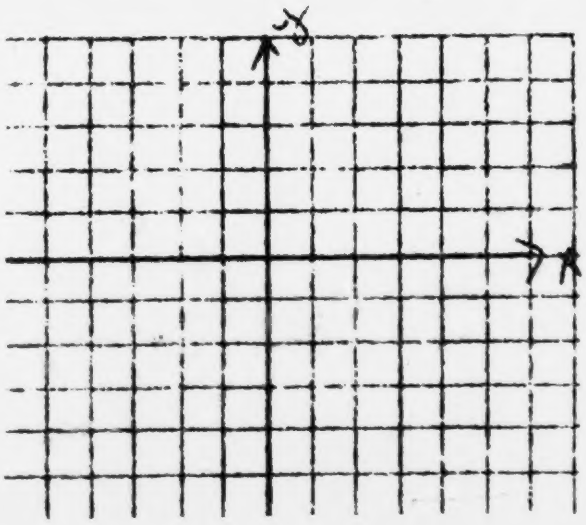


16.



______________________ COMMON SOLUTION

17. ______________________

18. ______________________

19. ______________________

20. ______________________

21. ______________________

UNIT X

The Real Numbers

PART I
Test A

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are not rational numbers? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. 3

   B. $\frac{2}{5}$

   C. $-\frac{3}{7}$

   D. $\sqrt{9}$

   E. $.76$

   F. $.\overline{63}$

   G. $\sqrt{13}$

   H. $\sqrt{.8}$

   I. $\sqrt{27}$

2. Arrange the following numbers in ascending order.

   $\frac{3}{5}$ $\frac{4}{7}$

3. Find a number between $\frac{1}{8}$ and $\frac{1}{9}$ by the average method.

4. Which of the following numbers are periodic?

   A. 1.414

   B. $1.833333\overline{3}$

   C. $.666667$

   D. $.7575...$

5. Express as a fraction in lowest terms $.\overline{47}$.

6. TRUE or FALSE: All rational numbers are also whole numbers.

7. COMPLETION: A rational number is the ________________ of two **integers**.

8. COMPLETION: .45 written as a rational number in simplest form is ____________.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: $a > b$, $a < b$, or $a = b$. This is a statement of the:

   A. Trichotomy Principle

   B. Density Property

   C. Reflexive Property

   D. Distributive Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{97}$ names a number which when squared gives ____________.

12. COMPLETION: In $\sqrt[7]{5}$, 7 is called the ______________.

13. Which of the following do NOT name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

A. $\sqrt{16}$

B. $\sqrt{-1}$

C. $\sqrt{5}$

Simplify Problems 14-33.

14. $(\sqrt{5})^2$

15. $(\sqrt{7d})^2$, where $d \geq 0$.

16. $(\sqrt{3})(\sqrt{7})$

17. $(5\sqrt{31})(7\sqrt{2})$

18. $\frac{\sqrt{6}}{\sqrt{2}}$

19. $\sqrt{100z^2}$

20. $\frac{1}{3}\sqrt{27}$

21. $\sqrt{49x^2y^2}$

22. $\sqrt{20}$

23. $5\sqrt{96}$

24. $\sqrt{\frac{5}{9}}$

25. $\sqrt{\frac{2}{7}}$

26. $\frac{2}{\sqrt{7}}$

27. $\sqrt{A}\ \sqrt{8A}$

28. $(5\sqrt{B})^2$

29. $\sqrt{7a^2}$

30. $\sqrt{\frac{6a}{7}}$

31. $\sqrt{(7ab)^2}$

32. $\sqrt{\frac{3x^2}{2}}$

33. $\frac{\sqrt{x}}{\sqrt{y}}$

UNIT X The Real Numbers PART I
Test B

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are rational numbers? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. 3
   B. $\frac{2}{5}$
   C. $-\frac{3}{7}$
   D. $\sqrt{9}$
   E. $.6\overline{3}$
   F. $\sqrt{13}$
   G. $\sqrt{8}$
   H. $\sqrt{27}$
   I. $.76$

2. Arrange the following numbers in ascending order. $\frac{3}{7}$, $\frac{4}{9}$

3. Find a number between $\frac{1}{7}$ and $\frac{1}{6}$ by the average method.

4. Which of the following numbers are periodic? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. $.77773$
   B. $.626262\ldots$
   C. 6.363
   D. $1.677\overline{7}$

5. Express as a fraction in lowest terms $.\overline{7}$.

6. COMPLETION: A rational number is the ____________ of two integers.

7. COMPLETION: .67 written as a rational number in simplest form is __________________.

8. TRUE or FALSE: All whole numbers are rational numbers.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: $a > b$, $a < b$, or $a = b$. This is a statement of the:

A. Density Property

B. Reflexive Property

C. Distributive Property

D. Trichotomy Principle

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{57}$ names a number which when squared gives ________________.

12. COMPLETION: In $\sqrt[7]{5}$, the index is __________________.

13. Which of the following do not name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

A. $\sqrt{-1}$

B. $\sqrt{25}$

C. $\sqrt{7}$

Simplify Problems 14-33.

14. $(\sqrt{7})^2$

15. $(\sqrt{6d})^2$, where $d \geq 0$

16. $(\sqrt{5})(\sqrt{7})$

17. $(3\sqrt{21})(2\sqrt{2})$

18. $\frac{\sqrt{10}}{\sqrt{2}}$

19. $\sqrt{144a^2}$

20. $\frac{1}{5}\sqrt{75}$

21. $\sqrt{64a^2x^2}$

22. $\sqrt{18}$

23. $4\sqrt{48}$

24. $\sqrt{\frac{7}{25}}$

25. $\sqrt{\frac{3}{5}}$

26. $\frac{3}{\sqrt{5}}$

27. $(\sqrt{B})(\sqrt{8B})$

28. $(3\sqrt{y})^2$

29. $\sqrt{5b^2}$

30. $\sqrt{\frac{5a}{3}}$

31. $\sqrt{(5xy)^2}$

32. $\sqrt{\frac{7a^2}{3}}$

33. $\frac{\sqrt{y}}{\sqrt{x}}$

UNIT X

The Real Numbers

PART I
Test C

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are not rational numbers? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. 4
   B. $\frac{3}{7}$
   C. $-\frac{5}{9}$
   D. $\sqrt{49}$
   E. $.\overline{74}$
   F. $\sqrt{7}$
   G. $\sqrt{27}$
   H. $\sqrt{5}$
   I. $.62$

2. Arrange the following numbers in ascending order. $\frac{2}{7}, \frac{3}{8}$

3. Find a number between $\frac{1}{5}$ and $\frac{1}{4}$ by the average method.

4. Which of the following numbers are not periodic? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. $.7773$
   B. $.626262\ldots$
   C. 6.363
   D. $1.677\overline{7}$

5. Express as a fraction in lowest terms $.\overline{45}$.

6. COMPLETION: .65 written as a rational number in simplest form is ____________________.

7. COMPLETION: A rational number is the ____________________ of two integers.

8. TRUE or FALSE: All rational numbers are also whole numbers.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: $a > b$, $a < b$ or $a = b$. This is a statement of the:

A. Distributive Property
B. Trichotomy Principle
C. Reflexive Property
D. Density Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{73}$ names a number which when squared gives ______.

12. COMPLETION: In $\sqrt[5]{8}$, the radicand is __________.

13. Which of the following do not name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

A. $\sqrt{36}$
B. $\sqrt{2}$
C. $\sqrt{-1}$
D. All of the above are real numbers.

Simplify Problems 14-33.

14. $(\sqrt{3})^2$

15. $(\sqrt{7x})^2$, where $x \geq 0$

16. $(\sqrt{3})(\sqrt{5})$

17. $(4\sqrt{15})(2\sqrt{2})$

18. $\frac{\sqrt{20}}{\sqrt{4}}$

19. $\sqrt{81a^2}$

20. $\frac{1}{4}\sqrt{48}$

21. $\sqrt{49y^2x^2}$

22. $\sqrt{12}$

23. $3\sqrt{24}$

24 $\sqrt{\frac{13}{36}}$

25. $\sqrt{\frac{2}{3}}$

26. $\frac{2}{\sqrt{3}}$

27. $(\sqrt{c})(\sqrt{12c})$

28. $(4\sqrt{y})^2$

29. $\sqrt{11a^2}$

30. $\sqrt{\frac{7a}{2}}$

31. $\sqrt{(7ab)^2}$

32. $\sqrt{\frac{5a^2}{3}}$

33. $\frac{\sqrt{a}}{\sqrt{b}}$

UNIT X The Real Numbers PART I
Test D

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are rational numbers? Write the letter(s) of the correct answer(s) on the answer sheet.

A. 4

B. $\frac{3}{7}$

C. $-\frac{5}{9}$

D. $\sqrt{49}$

E. $.\overline{74}$

F. $\sqrt{7}$

G. $\sqrt{27}$

H. $\sqrt{5}$

I. .62

2. Arrange the following numbers in ascending order. $\frac{3}{5}$, $\frac{2}{3}$

3. Find a number between $\frac{1}{6}$ and $\frac{1}{7}$ by the average method.

4. Which of the following numbers are periodic? Write the letter(s) of the correct answer(s) on the answer sheet.

A. .773

B. .727272...

C. $1.33\overline{3}$

D. 7.272

5. Express as a fraction in lowest terms $.\overline{5}$.

6. COMPLETION: .37 written as a rational number in simplest form is __________.

7. COMPLETION: A rational number is the ____________ of two integers.

8. TRUE or FALSE: All whole numbers are also rational numbers.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: $a > b$, $a < b$ or $a = b$. This is a statement of the:

A. Density Property
B. Distributive Property
C. Trichotomy Principle
D. Reflexive Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: In $\sqrt[4]{19}$, 19 is the ______.

12. COMPLETION: $\sqrt{52}$ names a number which when squared gives ______.

13. Which of the following does not name a real number? Write the letter(s) of this correct answer(s) on the answer sheet.

A. $\sqrt{-3}$
B. $\sqrt{49}$
C. $\sqrt{5}$
D. All of the above are real numbers.

Simplify Problems 14-33.

14. $(\sqrt{5})^2$

15. $(\sqrt{3a})^2$, where $a \geq 0$

16. $(\sqrt{2})(\sqrt{5})$

17. $(3\sqrt{7})(7\sqrt{3})$

18. $\frac{\sqrt{4}}{\sqrt{7}}$

19. $\sqrt{64a^2}$

20. $\frac{1}{2}\sqrt{12}$

21. $\sqrt{81a^2b^2}$

22. $\sqrt{45}$

23. $4\sqrt{90}$

24. $\sqrt{\frac{3}{7}}$

25. $\frac{3}{\sqrt{7}}$

26. $\sqrt{\frac{17}{81}}$

27. $(\sqrt{B})(\sqrt{45B})$

28. $(3\sqrt{a})^2$

29. $\sqrt{13a^2}$

30. $\sqrt{\frac{3a}{11}}$

31. $\sqrt{(11ab)^2}$

32. $\sqrt{\frac{7a^2}{13}}$

33. $\frac{\sqrt{b}}{\sqrt{a}}$

UNIT X

The Real Numbers

PART I
Test A B C D

NAME ______________________________ SECTION ______________

TEACHER ____________________________ DATE ________________

SCORE ______________________________ PERIOD ______________

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24. ______________________
25. ______________________
26. ______________________
27. ______________________
28. ______________________
29. ______________________
30. ______________________
31. ______________________
32. ______________________
33. ______________________

UNIT X

The Real Numbers

PART II
Test A

DIRECTIONS: Do not write on the test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1. Write the letter(s) of the correct answer(s) on the answer sheet. Which of the following terms are similar?

   A. $\sqrt{3}$

   B. $\sqrt{2}$

   C. $\sqrt[3]{3}$

   D. $7\sqrt{2}$

   E. $2\sqrt{7}$

Simplify Problems 2-8.

2. $4\sqrt{2} + 3\sqrt{2}$
3. $\sqrt{22} + 3\sqrt{11} - 8\sqrt{11}$
4. $5\sqrt{3} + 6\sqrt{3} - 2\sqrt{5}$
5. $5\sqrt{2} + 3\sqrt{8}$
6. $2\sqrt{12} - \sqrt{27}$
7. $(\sqrt{3} + \sqrt{5})(\sqrt{3} - \sqrt{5})$
8. $(1 - \sqrt{3})(2 - 3\sqrt{3})$
9. Write the conjugate of $3 - \sqrt{13}$.
10. Write the conjugate of $\sqrt{7} + \sqrt{5}$
11. Simplify by rationalizing the denominator. $\dfrac{5}{1 + \sqrt{2}}$
12. Simplify by rationalizing the denominator. $\dfrac{6}{\sqrt{3} + \sqrt{5}}$

Simplify Problems 13-19.

13. $(-2\sqrt{a})(6\sqrt{ab})$

14. $\sqrt{15a^2b}$

15. $\frac{1}{2}\sqrt{8a} \cdot \sqrt{12a}$

16. $\sqrt{\frac{5a^2}{3}}$

17. $\sqrt{\frac{7}{2a}}$

18. $\sqrt{\frac{9y^2}{3x}}$

19. $\frac{\sqrt{8x}}{\sqrt{2z}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{x} = 5$

21. $\sqrt{x+5} = 3$

22. $\sqrt{x} + 7 = 4$

UNIT X

The Real Numbers

PART II
Test B

DIRECTIONS: Do not write on the test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1. On the answer sheet, write the letter(s) of the correct answer(s). Which of the following terms are similar?

   A. $\sqrt{5}$

   B. $\sqrt[3]{2}$

   C. $2\sqrt{3}$

   D. $7\sqrt{5}$

   E. $5\sqrt{7}$

Simplify Problems 2-8.

2. $7\sqrt{5} - 3\sqrt{5}$
3. $\sqrt{3} - 6\sqrt{3} + 2\sqrt{3}$
4. $4\sqrt{7} + 3\sqrt{7} + 10\sqrt{2}$
5. $12\sqrt{2} - 2\sqrt{18}$
6. $3\sqrt{50} + 7\sqrt{8}$
7. $(\sqrt{2} - \sqrt{7})(\sqrt{2} + \sqrt{7})$
8. $(2 - \sqrt{2})(3 - 3\sqrt{2})$
9. Write the conjugate of $9 + \sqrt{10}$.
10. Write the conjugate of $\sqrt{3} - \sqrt{5}$
11. Simplify by rationalizing the denominator. $\dfrac{6}{\sqrt{3} - 1}$
12. Simplify by rationalizing the denominator. $\dfrac{3}{\sqrt{2} - \sqrt{7}}$

Simplify Problems 13-19.

13. $(3\sqrt{c})(-5\sqrt{cd})$

14. $\sqrt{21m^2n}$

15. $\frac{1}{3}\sqrt{18x} - \sqrt{2x}$

16. $\sqrt{\frac{7r^2}{2}}$

17. $\sqrt{\frac{5}{4t}}$

18. $\sqrt{\frac{8a^2}{4b}}$

19. $\frac{\sqrt{18g}}{\sqrt{2h}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{y} = 7$

21. $\sqrt{m} - 3 = 4$

22. $\sqrt{y} + 3 = 1$

UNIT X

The Real Numbers

PART II
Test C

DIRECTIONS: Do not write on the test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1. On the answer sheet, write the letter(s) of the correct answer(s). Which of the following terms are similar?

A. $\sqrt{5}$

B. $\sqrt{3}$

C. $3\sqrt{5}$

D. $7\sqrt{11}$

E. $11\sqrt{7}$

Simplify Problems 2-8.

2. $5\sqrt{6} - 2\sqrt{6}$

3. $\sqrt{7} - 12\sqrt{7} + 9\sqrt{7}$

4. $3\sqrt{6} - 8\sqrt{2} + 5\sqrt{2}$

5. $6\sqrt{3} + 2\sqrt{27}$

6. $10\sqrt{20} + 3\sqrt{45}$

7. $(\sqrt{6} - \sqrt{2})(\sqrt{6} + \sqrt{2})$

8. $(3 + \sqrt{5})(4 + 2\sqrt{5})$

9. Write the conjugate of $\sqrt{11} - 4$

10. Write the conjugate of $\sqrt{2} + \sqrt{3}$

11. Simplify by rationalizing the denominator. $\dfrac{2}{4 - \sqrt{2}}$

12. Simplify by rationalizing the denominator $\dfrac{3}{\sqrt{2} - \sqrt{5}}$

Simplify Problems 13-19.

13. $(-4\sqrt{x})(3\sqrt{xy})$

14. $\sqrt{6m^2n}$

15. $\frac{1}{2}\sqrt{24r} \cdot \sqrt{2r}$

16. $\sqrt{\frac{7x^2}{2}}$

17 $\sqrt{\frac{5}{3m}}$

18. $\sqrt{\frac{16m^2}{8n}}$

19. $\frac{\sqrt{27y}}{\sqrt{3x}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{m} = 3$

21. $\sqrt{r} + 6 = 8$

22. $\sqrt{y} + 9 = 2$

UNIT X The Real Numbers PART II
Test D

DIRECTIONS: Do not write on the test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1. On the answer sheet, write the letter(s) of the correct answer(s). Which of the following terms are similar?

A. $\sqrt{11}$

B. $\sqrt{7}$

C. $3\sqrt{2}$

D. $2\sqrt{3}$

E. $5\sqrt{3}$

Simplify Problems 2-8.

2. $8\sqrt{11} - 12\sqrt{11}$

3. $4\sqrt{2} + 3\sqrt{2} - \sqrt{2}$

4. $3\sqrt{7} - 7\sqrt{7} + 3\sqrt{3}$

5. $12\sqrt{5} - 7\sqrt{20}$

6. $10\sqrt{45} + 3\sqrt{125}$

7. $(\sqrt{2} + \sqrt{7})(\sqrt{2} - \sqrt{7})$

8. $(2\sqrt{5} - 3)(\sqrt{5} - 2)$

9. Write the conjugate of $\sqrt{7} + 5$.

10. Write the conjugate of $\sqrt{2} - \sqrt{11}$

11. Simplify by rationalizing the denominator. $\dfrac{2}{\sqrt{3} - 2}$

12. Simplify by rationalizing the denominator. $\dfrac{7}{\sqrt{11} - \sqrt{2}}$

Simplify Problems 13-19.

13. $(-4\sqrt{m})(3\sqrt{mn})$

14. $\sqrt{14xy^2}$

15. $\frac{1}{3}\sqrt{18a} \cdot \sqrt{3a}$

16. $\sqrt{\frac{7c^2}{3}}$

17. $\sqrt{\frac{5}{3x}}$

18. $\sqrt{\frac{25a}{5b^2}}$

19. $\frac{\sqrt{50a}}{\sqrt{2b}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{a} = 10$

21. $\sqrt{c} - 3 = 2$

22. $\sqrt{y} + 5 = 1$

UNIT X

The Real Numbers

PART II
Test A B C D

NAME ______________________ SECTION ____________

TEACHER ______________________ DATE ____________

SCORE ______________________ PERIOD ____________

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12. ____________________
13. ____________________
14. ____________________
15. ____________________
16. ____________________
17. ____________________
18. ____________________
19. ____________________
20. ____________________
21. ____________________
22. ____________________

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. A ________________ (relation, function) is a set of ordered pairs whose first coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	1	2	3	4
y	1	0	1	2

2. What is the domain of this relation?

3. What is the range of this relation?

4. On the answer sheet, write the letter(s) of the following ordered pairs which are coordinates of points on the graph of this relation.

A. (0, 2) C. (3, 2)

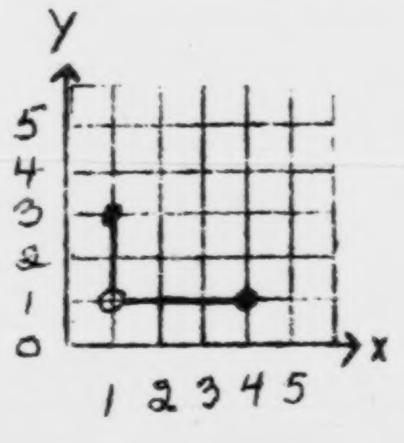
B. (3, 1) D. (2, 4)

5. Which one of the following is a formula for the relation? On your answer sheet write the letter of the correct answer.

A. $y = |2 - x|$ C. $y = (x - 2)^2$

B. $y = 2 - x$ D. $y = x - 2$

Questions 6-8 refer to the relation whose graph is shown below.



6. TRUE or FALSE: This relation is a function.

7. The domain of the relation is: (On your answer sheet write the letter of the correct answer.)

A. {1} C. {real numbers between 1 and 3 inclusive}

B. {1, 4} D. {real numbers between 1 and 4 inclusive}

8. The range of the relation is: (On your answer sheet write the letter of the correct answer.)

A. {1} C. {real numbers between 1 and 3 inclusive}

B. {1, 3} D. {real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: {(4, 9), (5, 8), (4, -6), (3, 8)} is a function?

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	{1, 3, 5}	?	$y = 2x - 3$
11.	?	{1, 3, 5}	$y = 2x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	2	4	8
y	6	12	24

13. Using the same roster as in number 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 6$ when $x = 5$, what is y when $x = 6$?

15. The elongation of a spring varies directly as the stretching force. If 10 pounds stretches a spring 8 inches, what force will stretch it 9 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, choose the appropriate answer in the right-hand column.

16. $\frac{a}{b}$ and $\frac{c}{d}$ A. extremes

17. $\frac{a}{b} = \frac{c}{d}$ B. means

18. a and d C. proportion

19. b and c D. ratios

20. The length of the shadow of an object varies directly as his height. If a 6 foot man casts a 4 foot shadow, how high is a building which casts a 120 foot shadow at the same hour?

21. Solve for X: $\frac{X + 1}{2X - 7} = \frac{2X + 7}{X - 1}$

Questions 22-24: For each statement in the left-hand column, write the letter of the correct formula in the right-hand column on your answer sheet.

22. y varies directly as $\frac{1}{x}$ A. $y = kx$

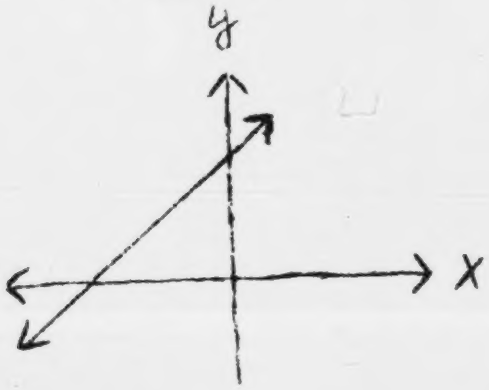
23. y varies inversely as x^2 B. $y = \frac{k}{x}$

24. xy varies directly as x^2 C. $y = \frac{k}{x^2}$

D. $y = kx^2$

25. If y varies inversely as x and y = 6 when x = 7, what is y when x = 3?

26. TRUE or FALSE: The drawing below is the graph of a direct variation?



27. If the table of values defines an inverse variation, then a = __________.

x	2	1	-8
y	4	3	a

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. A function is a set of ordered pairs whose ____________ (first, second) coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	1	2	3	4
y	1	0	1	4

2. What is the domain of this relation?

3. What is the range of this relation?

4. Which of the following ordered pairs are coordinates of points on the graph of this relation? Write the letter(s) of the correct answer(s) on your answer sheet.

A. (2, 4) C. (3, 1)

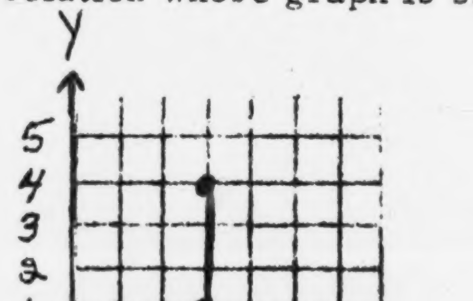
B. (3, 2) D. (0, 2)

5. Which of the following is a formula for the relation? Write the letter of the correct answer on your answer sheet.

A. $y = 2 - x$ C. $y = (2 - x)^2$

B. $y = 2 - x$ D. $y = x - 2$

Questions 6-8 refer to the relation whose graph is shown below.



6. TRUE or FALSE: This relation is a function.

7. The domain of the relation is: (On your answer sheet write the letter of the correct answer.)

   A. $\{1\}$ C. {real numbers between 1 and 3 including 1}

   B. $\{1, 3\}$ D. {real numbers between 1 and 4 including 4}

8. The range of the relation is: (On your answer sheet write the letter of of the correct answer.)

   A. $\{1\}$ C. {real numbers between 1 and 3 inclusive}

   B. $\{1, 4\}$ D. {real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: $\{(4, 9), (5, 8), (3, 6), (4, 1)\}$ is a function.

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	$\{1, 3, 5\}$	?	$y = 2x - 3$
11.	?	$\{1, 3, 5\}$	$y = 2x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x.

x	6	3	1
y	24	12	4

13. Using the same roster as in number 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 6$ when $x = 7$, what is y when $x = 6$?

15. The elongation of a spring varies directly as the stretching force. If 12 pounds stretches the spring 8 inches, what force will stretch it 9 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the letter of the correct answer from the right-hand column of your answer sheet.

16. $\frac{a}{b}$ and $\frac{c}{d}$

17. $\frac{a}{b}$ and $\frac{c}{d}$

18. a and d

19. b and c

A. means

B. proportion

C. ratios

D. extremes

20. The length of the shadow of an object varies directly as his height. If a six foot man casts a 5 foot shadow, how high is a building which casts a 120 foot shadow at the same hour.

21. Solve for a: $\frac{a + 1}{2a - 7} = \frac{2a + 7}{a - 1}$

Questions 22-24: For each statement in the left hand column, write the letter of the correct formula in the right-hand column on your answer sheet.

22. y varies directly as x^2

23. xy varies directly as x^2

24. y varies directly as $\frac{1}{x}$

A. $y = kx$

B. $y = \frac{k}{x}$

C. $y = \frac{k}{x^2}$

D. $y = kx^2$

25. If y varies inversely as x and y = 6 when x = 10, what is y when x = 3?

26. TRUE or FALSE: The drawing below is the graph of a direct variation.

27. If the table defines an inverse variation then a = ________________.

x	3	$\frac{1}{2}$	-1

UNIT XI Relations, Functions and Variation Test C

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. A ________________ (relation, function) is a set of ordered pairs whose first coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	0	1	2	3
y	2	1	0	1

2. What is the domain of this relation?

3. What is the range of this relation?

4. Which of the following ordered pairs are coordinates of points on the graph of this relation? Write the letter(s) of the correct answer(s) on your answer sheet.

A. (0, 2) C. (3, 2)

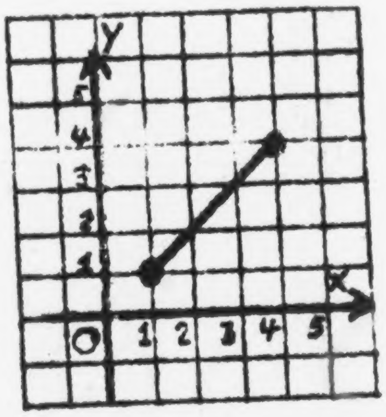
B. (3, 1) D. (2, 4)

5. Which one of the following is a formula for the relation? Write the letter of the correct answer on your answer sheet.

A. $y = (x - 2)^2$ C. $y = 2 - x$

B. $y = x - 2$ D. $y = |2 - x|$

Questions 6-8 refer to the relation whose graph is shown below.



6. TRUE or FALSE: This relation is a function.

7. Write the letter of the correct answer on your answer sheet.
The domain of the relation is:

A.	{1}	C.	{real numbers between 1 and 4 inclusive}
B.	{1, 4}	D.	{real numbers between 1 and 3 inclusive}

8. Write the letter of the correct answer on your answer sheet.
The range of the relation is:

A.	{1}	C.	{real numbers between 1 and 3 inclusive}
B.	{1, 3}	D.	{real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: The set {(4, 9) (5, 8) (4, -6) (5, 7)} is a function.

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	{1, 3, 5}	?	$y = 3x - 2$
11.	?	{2, 5, 8}	$y = 3x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	2	6	10
y	1	3	5

13. Using the same roster as in Problem 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 5$, when $x = 4$, what is y where $x = 8$?

15. The elongation of a spring varies directly as a stretching force. If 5 pounds stretches a spring 4 inches, what force will stretch it 7 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the letter of the correct answer in the right-hand column on the answer sheet.

16. $\frac{a}{b}$ and $\frac{c}{d}$

17. $\frac{a}{b} = \frac{c}{d}$

18. a and d

19. b and c

A. proportion

B. ratios

C. means

D. extremes

20. The length of a shadow of an object varies directly as its height. If a 5 foot man casts a 3-1/2 foot shadow, how high is a building which casts a 120 foot shadow at the same hour?

21. Solve for y: $\frac{2y + 7}{y - 1} = \frac{y + 1}{2y - 7}$

In Problems 22-24, write the letter of the correct formula on your answer sheet.

22. y varies directly as $\frac{1}{x}$

23. y varies inversely as x^2

24. xy varies directly as x^2

A. $y = kx^2$

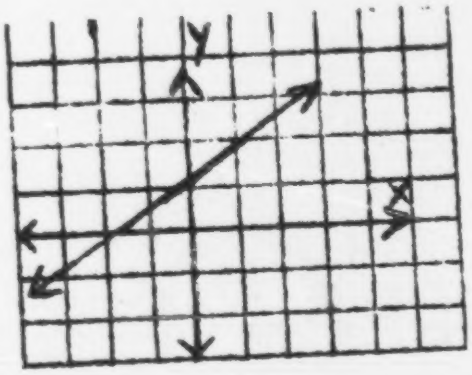
B. $y = \frac{k}{x^2}$

C. $y = \frac{k}{x}$

D. $y = kx$

25. If y varies inversely as y = 6 where x = 7, what is y when x = 2?

26. TRUE or FALSE: The drawing below is the graph of a direct variation.



27. If the table of values defines an inverse variation, then a = ____________.

x	2	1	a
y	4	8	-8

UNIT XI Relations, Functions and Variation Test D

DIRECTIONS: Do not write on this test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1. A function is a set of ordered pairs whose ________________ (first, second) coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	-2	0	1	5
y	16	4	1	9

2. What is the domain of this relation?

3. What is the range of this relation?

4. Which of the following ordered pairs are coordinates of points on the graph of this relation? Write the letter(s) of the correct answer(s) on your answer sheet.

A. (5, 9) C. (1, 1)

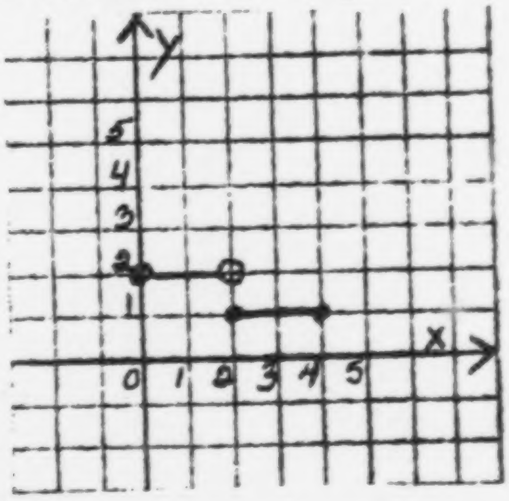
B. (4, 0) D. (0, 16)

5. Which one of the following is a formula for the relation? Write the letter of the correct answer on your answer sheet.

A. $y = 2 - x$ C. $y = x - 2$

B. $y = (x - 2)^2$ D. $y = 2 - x$

Questions 6-8 refer to the relations whose graph is shown below.



6. TRUE or FALSE: This relation is a funtion.

7. The domain of the relationship is: (Write the letter of the correct answer on your answer sheet.)

A. {0, 2, 3}
C. {real numbers between 2 and 3 inclusive}
B. {2, 1}
D. {real numbers between 0 and 3 inclusive}

8. The range of the relation is: (Write the letter of the correct answer on your answer sheet.)

A. {0, 2, 3}
C. {real numbers between 2 and 3 inclusive}
B. {2, 1}
D. {real numbers between 0 and 3 inclusive}

9. TRUE or FALSE: {(1, 3), (-2, 5), (0, 4), (3, 5)} is a function.

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	{-1, 0, 1}	?	$y = 3x - 2$
11.	?	{-1, 3, 7}	$y = 2x + 3$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	-2	1	3
y	4	-2	-6

13. Using the same roster as in Problem 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 12$ when $x = 5$, what is y when $x = 2$?

15. The compression of a spring varies directly as the force applied. If 5 pounds of pressure compresses the spring 2 inches, what force will compress it 5 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the letter of the correct answer in the right-hand column on your answer sheet.

16. a and d

17 $\frac{a}{b}$ and $\frac{c}{d}$

18. b and c

19. $\frac{a}{b} = \frac{c}{d}$

A. ratios

B. proportion

C. means

D. extremes

20. The length of the shadow of an object varies directly as its he
If an 18 foot flag pole casts a shadow 12 feet long, what is the
of a man whose shadow is 4 feet long at the same time?

21. Solve for k: $\frac{2k + 7}{k - 1} = \frac{k + 1}{2k - 7}$

Questions 22-24: For each statement in the left-hand column, writ
letter of the correct formula in the right-hand column on your answ
sheet.

22. y varies inversely as x^2

23. xy varies directly as x^2

24. y varies directly as $\frac{1}{x}$

A. $y = kx$

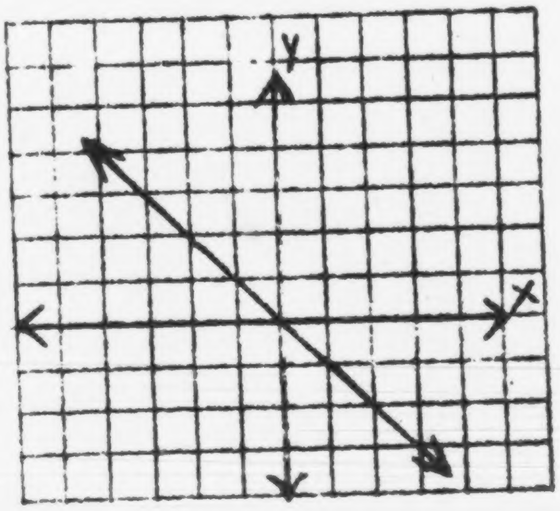
B. $y = \frac{k}{x^2}$

C. $y = \frac{k}{x}$

D. $y = kx^2$

25. If y varies inversely as x and y = 9 and x = 2, what is x wher

26. TRUE or FALSE: The drawing below is the graph of a d
variation.



27. If the table of values defines an inverse variation, then a = ______________.

x	2	-1	a
y	-3	6	-2

UNIT XI　　　Relations, Functions and Variation　　　Test A B C D

NAME ______________________________ SECTION ______________

TEACHER ____________________________ DATE ________________

SCORE ______________________________ PERIOD ______________

1. ______________________

2. ______________________

3. ______________________

4. ______________________

5. ______________________

6. ______________________

7. ______________________

8. ______________________

9. ______________________

10. ______________________

11. ______________________

12. ______________________

13. ______________________

14. ______________________

15. ______________________

16. ______________________

17. ______________________

18. ______________________

19. ______________________

20. ______________________

21. ______________________

22. ______________________

23. ______________________

24. ______________________

25. ______________________

26. ______________________

27. ______________________

APPENDIX C

ANSWER KEYS AND CHECK LISTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

Acceptable Score $\frac{21}{28}$

UNIT I

TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

PART II
Test A

I.	1.	A	(5)
	2.	A	(5)
	3.	B	(5)
	4.	B	(5)
	5.	B	(5)
	6.	C	(5)
	7.	B	(5)
II.	1.	True	(3)
	2.	False	(3)
	3.	False	(3)
	4.	True	(3)
	5.	False	(3)
III.	1.	B	(6)
	2.	$3\frac{1}{2}$	(6)
	3.	1	(6)
IV.	1.	< B	(4)
	2.	= A	(4)
	3.	> C	(4)
	4.	> C	(4)
V.	1.	B	(6)
	2.	C	(6)
	3.	D	(6)
	4.	B	(6)
VI.	1.	1	(7)
	2.	15	(7)
	3.	8	(7)
	4.	12	(7)
	5.	10	(7)

Acceptable Score $\frac{21}{28}$

UNIT I

TEACHER'S ANSWER KEY

PART II
Test B

FIRST YEAR ALGEBRA

I.	1.	A	(5)
	2.	A	(5)
	3.	A	(5)
	4.	B	(5)
	5.	B	(5)
	6.	C	(5)
	7.	B	(5)
II.	1.	False	(3)
	2.	True	(3)
	3.	False	(3)
	4.	True	(3)
	5.	True	(3)
III.	1.	H	(6)
	2.	3	(6)
	3.	2	(6)
IV.	1.	> C	(4)
	2.	> C	(4)
	3.	= A	(4)
	4.	> C	(4)

V.	1.	B	(6)
	2.	D	(6)
	3.	D	(6)
	4.	A	(6)
VI.	1.	12	(7)
	2.	18	(7)
	3.	16	(7)
	4.	8	(7)
	5.	5	(7)

Acceptable Score $\frac{29}{42}$

UNIT II

TEACHER'S ANSWER KEY

Test A

FIRST YEAR ALGEBRA

1.	D	(8)
2.	F	(8)
3.	B	(9)
4.	G	(9)
5.	H	(9)
6.	I	(9)
7.	E	(8)
8.	4	(8)
9.	3	(9)
10.	B	(8)
11.	E	(8)
12.	18	(8, 9)
13.	36	(8, 9)
14.	7	(8, 9)
15.	25	(8, 9)
16.	55	(8, 9)
17.	Yes	(10)
18.	Yes	(10)
19.	No	(10)
20.	Yes	(10)
21.	Yes	(10)
22.	No	(10)
23.	No	(10)
24.	$x + 5$	(10)
25.	$a - 7$	(10)
26.	$5 - n$	(10)
27.	$7c$	(10)
28.	$2d + 6$	(10)
29.	$3f - 2$	(10)
30.	$5(m + 2)$	(10)
31.	$2w > 3$	(11)
32.	$x + 7 = 15$	(11)
33.	b^3	(9)
34.	2^4	(9)
35.	$(6a)^2$	(9)
36.	0	(9)
37.	1	(9)
38.	16	(9)
39.	32	(9)
40.	$8a^2$	(9)
41.	$27a^3$	(9)
42.	$81x^2$	(9)

Acceptable Score $\frac{29}{42}$

UNIT II

TEACHER'S ANSWER KEY

Test B

FIRST YEAR ALGEBRA

1.	D	(8)
2.	F	(8)
3.	B	(9)
4.	G	(9)
5.	H	(9)
6.	I	(9)
7.	E	(9)
8.	4	(8)
9.	3	(9)
10.	B	(8)
11.	E	(8)
12.	16	(8, 9)
13.	64	(8, 9)
14.	5	(8, 9)
15.	25	(8, 9)
16.	30	(8, 9)
17.	Yes	(10)
18.	No	(10)
19.	No	(10)
20.	Yes	(10)
21.	Yes	(10)
22.	No	(10)
23.	No	(10)
24.	$x + 9$	(10)
25.	$a - 12$	(10)
26.	$11 - n$	(10)
27.	$8c$	(10)
28.	$3d + 5$	(10)
29.	$3f + 1$	(10)
30.	$4(h + 3)$	(10)
31.	$3w < 2$	(11)
32.	$y - 10 = 26$	(11)
33.	b^3	(9)
34.	2^4	(9)
35.	$(6a)^2$	(9)
36.	0	(9)
37.	1	(9)
38.	16	(9)
39.	32	(9)
40.	$8a^2$	(9)
41.	$27a^3$	(9)
42.	$81x^2$	(9)

Acceptable Score $\frac{29}{42}$

UNIT II

Test C

TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

1.	D	(8)
2.	F	(8)
3.	B	(9)
4.	G	(9)
5.	H	(9)
6.	I	(9)
7.	E	(8)
8.	3	(8)
9.	4	(9)
10.	B	(8)
11.	E	(8)
12.	20	(8, 9)
13.	100	(8, 9)
14.	8	(8, 9)
15.	49	(8, 9)
16.	66	(8, 9)
17.	Yes	(10)
18.	Yes	(10)
19.	Yes	(10)
20.	Yes	(10)
21.	No	(10)
22.	No	(10)
23.	No	(10)
24.	$x + 2$	(10)
25.	$n - 5$	(10)
26.	$2 - x$	(10)
27.	$17b$	(10)
28.	$3y + 4$	(10)
29.	$2s - 1$	(10)
30.	$3(a + 5)$	(10)
31.	$2n > 5$	(11)
32.	$c + 5 = 15$	(11)
33.	x^3	(9)
34.	3^5	(9)
35.	$(5b)^2$	(9)
36.	0	(9)
37.	1	(9)
38.	9	(9)
39.	32	(9)
40.	$12b^2$	(9)
41.	$4b^2$	(9)
42.	$125y^3$	(9)

Acceptable Score $\frac{29}{42}$

UNIT II

TEACHER'S ANSWER KEY

Test D

FIRST YEAR ALGEBRA

1.	I	(8)
2.	G	(8)
3.	H	(9)
4.	E	(9)
5.	F	(9)
6.	D	(9)
7.	C	(8)
8.	4	(8)
9.	3	(9)
10.	A	(8)
11.	E	(8)
12.	12	(8, 9)
13.	36	(8, 9)
14.	6	(8, 9)
15.	64	(8, 9)
16.	33	(8, 9)
17.	Yes	(10)
18.	No	(10)
19.	Yes	(10)
20.	No	(10)
21.	No	(10)
22.	No	(10)
23.	Yes	(10)
24.	$y + 6$	(10)
25.	$m - 8$	(10)
26.	$12 - y$	(10)
27.	$7d$	(10)
28.	$7x + 4$	(10)
29.	$3y - 1$	(10)
30.	$7(h + 4)$	(10)
31.	$4v > 6$	(11)
32.	$m + 21 = 43$	(11)
33.	b^4	(9)
34.	4^3	(9)
35.	$(7a)^2$	(9)
36.	1	(9)
37.	0	(9)
38.	36	(9)
39.	81	(9)
40.	$12a^2$	(9)
41.	$8a^3$	(9)
42.	$49x^2$	(9)

Acceptable Score $\frac{30}{40}$

UNIT III

TEACHER'S ANSWER KEY

Test A

FIRST YEAR ALGEBRA

1.	0	(15)
2.	1	(15)
3.	b = R	(12)
4.	0	(15)
5.	1	
6.	16	(15)
7.	0	(15)
8.	6	(15)
9.	0	(15)
10.	No meaning.	(15)
11.	No meaning.	(15)
12.	6y	(15)
13.	6RS	
14.	32xy	
15.	False	(13)
16.	True	(13)
17.	True	(13)
18.	B	(12)
19.	D	(12)
20.	A	(12)
21.	C	(12)
22.	B	(12)
23.	E	(15)
24.	A	(14)
25.	D	(14)
26.	B	(14)
27.	A	(14)
28.	B	(15)
29.	A	(15)
30.	D	(15)
31.	C	(15)
32.	D	(15)
33.	$\frac{8}{3}$	
34.	$\frac{1}{2}$	
35.	1	
36.	B	(15)
37.	12A	(15)
38.	8q + 11	(15)
39.	12v + 9w	(15)
40.	6R + 2S - 1	(15)

Acceptable Score $\frac{30}{40}$

UNIT III

TEACHER'S ANSWER KEY

Test B

FIRST YEAR ALGEBRA

1.	1	(15)
2.	0	(15)
3.	0	(15)
4.	1	
5.	B = D	(12)
6.	7	(15)
7.	0	(15)
8.	6	(15)
9.	No meaning.	(15)
10.	0	(15)
11.	No meaning.	(15)
12.	36a	
13.	5xy	
14.	63xy	
15.	True	(13)
16.	False	(13)
17.	False	(13)
18.	C	(12)
19.	B	(12)
20.	D	(12)
21.	B	(12)
22.	A	(12)
23.	A	(14)
24.	B	(14)
25.	A	(14)
26.	E	(15)
27.	D	(14)
28.	C	(15)
29.	D	(15)
30.	D	(15)
31.	A	(15)
32.	B	(15)
33.	$\frac{7}{3}$	
34.	$\frac{1}{9}$	
35.	1	
36.	D	(15)
37.	156	(15)
38.	11q + 12	(15)
39.	16a + 7b	(15)
40.	6a + 9b - 4	(15)

Acceptable Score $\frac{30}{40}$

UNIT III

TEACHER'S ANSWER KEY

Test C

FIRST YEAR ALGEBRA

1.	0	(15)
2.	1	(15)
3.	$a = Q$	(12)
4.	0	(15)
5.	1	
6.	20	(15)
7.	0	(15)
8.	No meaning.	(15)
9.	8	(15)
10.	No meaning.	(15)
11.	0	(15)
12.	12w	
13.	8RS	
14.	63xy	
15.	True	(13)
16.	False	(13)
17.	True	(13)
18.	B	(12)
19.	A	(12)
20.	C	(12)
21.	D	(12)
22.	B	(12)
23.	A	(14)
24.	D	(15)
25.	E	(15)
26.	A	(14)
27.	C	(14)
28.	D	(15)
29.	D	(15)
30.	B	(15)
31.	A	(15)
32.	C	(15)
33.	$\frac{7}{5}$	
34.	$\frac{1}{5}$	
35.	1	
36.	D	(15)
37.	10a	(15)
38.	$4w + 12$	(15)
39.	$23q + 3r$	(15)
40.	$7R + 3S - 1$	(15)

Acceptable Score $\frac{20}{40}$

UNIT III

TEACHER'S ANSWER KEY

Test D

FIRST YEAR ALGEBRA

1.	N = B	(12)
2.	0	(15)
3.	1	(15)
4.	1	
5.	0	(15)
6.	15	(15)
7.	5	(15)
8.	No meaning.	(15)
9.	0	(15)
10.	No meaning.	(15)
11.	0	(15)
12.	15a	
13.	4xy	
14.	15xy	
15.	True	(13)
16.	False	(13)
17.	True	(13)
18.	D	(12)
19.	A	(12)
20.	B	(12)
21.	C	(12)
22.	A	(12)
23.	B	(14)
24.	A	(14)
25.	D	(14)
26.	E	(15)
27.	C	(14)
28.	B	(15)
29.	D	(15)
30.	C	(15)
31.	D	(15)
32.	A	(15)
33.	1	
34.	$\frac{1}{6}$	
35.	$\frac{3}{7}$	
36.	C	(15)
37.	17a	(15)
38.	10a - 5	(15)
39.	16a - 6b	(15)
40.	6x + 3y + 4	(15)

Acceptable Score $\frac{32}{39}$

UNIT IV

TEACHER'S ANSWER KEY

PART I
Test A

FIRST YEAR ALGEBRA

1.	5	(17)
2.	-3	(17)
3.	0	(17)
4.	$\frac{7}{8}$	(17)
5.	$\frac{1}{4}$	(17)
6.	False	(16)
7.	F	(16)
8.	A	(16)
9.	-1 (D)	(16)
10.	Add	(19)
11.	False	(19)
12.	Reciprocal	(25)
13.	Negative	(16)
14.	-9	(19)
15.	4	(19)
16.	$\frac{1}{5}$	(19)
17.	Zero	(19)
18.	Zero	(19)
19.	20	(20)
20.	4	(20)
21.	0	(20)
22.	True	(20)
23.	32	(18)
24.	4	(18)
25.	-7	(18)
26.	-8	(18)
27.	-73	(18)
28.	9	(18)
29.	36	(23)
30.	28	(23)
31.	-51	(23)
32.	4	(25)
33.	2	(25)
34.	-4	(25)
35.	-5	(25)
36.	-18	(26)
37.	8	(19)
38.	-20	(19)
39.	+ 72	(19)

Acceptable Score $\frac{32}{39}$

UNIT IV

TEACHER'S ANSWER KEY

PART I
Test B

FIRST YEAR ALGEBRA

1.	4	(17)
2.	-6	(17)
3.	0	(17)
4.	$\frac{5}{6}$	(17)
5.	$\frac{1}{3}$	(17)
6.	False	(17)
7.	B	(16)
8.	E	(16)
9.	C	(16)
10.	False	(19)
11.	False	(19)
12.	Reciprocal	(25)
13.	Positive	(16)
14.	-7	(19)
15.	3	(19)
16.	$\frac{2}{3}$	(19)
17.	0	(19)
18.	True	(19)
19.	16	(20)
20.	3	(20)
21.	0	(20)
22.	True	(20)
23.	33	(18)
24.	4	(18)
25.	-6	(18)
26.	-1	(18)
27.	-80	(18)
28.	13	(18)
29.	24	(23)
30.	-30	(23)
31.	-68	(23)
32.	9	(25)
33.	4	(25)
34.	-2	(25)
35.	-6	(25)
36.	-6	(26)
37.	17	(19)
38.	-12	(19)
39.	32	(19)

Acceptable Score $\frac{32}{39}$

UNIT IV

TEACHER'S ANSWER KEY

PART I
Test C

FIRST YEAR ALGEBRA

1.	3	(17)
2.	-2	(17)
3.	0	(17)
4.	$\frac{3}{8}$	(17)
5.	$\frac{1}{3}$	(17)
6.	False	(16)
7.	I	(16)
8.	J	(16)
9.	F	(16)
10.	Add	(19)
11.	False	(19)
12.	Reciprocal	(25)
13.	Negative	(16)
14.	-8	(19)
15.	7	(19)
16.	$\frac{1}{3}$	(19)
17.	0	(19)
18.	0	(19)
19.	31	(20)
20.	9	(20)
21.	0	(20)
22.	True	(20)
23.	31	(18)
24.	7	(18)
25.	-3	(18)
26.	-9	(18)
27.	-89	(18)
28.	9	(18)
29.	120	(23)
30.	21	(23)
31.	-34	(23)
32.	5	(23)
33.	2	(25)
34.	-5	(25)
35.	-5	(25)
36.	-9	(26)
37.	12	(19)
38.	-19	(19)
39.	90	(19)

Acceptable Score $\frac{32}{39}$

UNIT IV

TEACHER'S ANSWER KEY

PART I
Test D

FIRST YEAR ALGEBRA

1.	6	(17)
2.	-2	(17)
3.	0	(17)
4.	$\frac{4}{5}$	(17)
5.	$\frac{1}{5}$	(17)
6.	False	(16)
7.	G	(16)
8.	D	(16)
9.	I	(16)
10.	False	(19)
11.	Negative	(19)
12.	Reciprocal	(25)
13.	True	(16)
14.	-6	(19)
15.	2	(19)
16.	$\frac{5}{7}$	(19)
17.	0	(19)
18.	True	(19)
19.	17	(20)
20.	4	(20)
21.	0	(20)
22.	True	(20)
23.	23	(18)
24.	2	(18)
25.	-7	(18)
26.	-2	(18)
27.	-58	(18)
28.	11	(18)
29.	36	(23)
30.	-24	(23)
31.	-45	(23)
32.	5	(23)
33.	3	(25)
34.	-3	(25)
35.	-7	(25)
36.	-3	(26)
37.	3	(19)
38.	-22	(19)
39.	27	(19)

Acceptable Score $\frac{15}{20}$

UNIT IV

TEACHER'S ANSWER KEY

PART II
Test A

FIRST YEAR ALGEBRA

1.	1	(25)
2.	$-\frac{1}{4}$	(25)
3.	$\frac{5}{12}$	(25)
4.	$\frac{4}{5}$	(25)
5.	One	(25)
6.	Zero	(25)
7.	Positive	(23)
8.	Negative	(23)
9.	$-15xy$	(23)
10.	$-8a^3$	(23)
11.	$4a^2$	(23)
12.	False	(13)
13.	True	(13)
14.	$5x$	(19)
15.	$-10y$	(26)
16.	$8x + z$	(18)
17.	$x + y$	(19)
18.	$12a - b$	(26)
19.	$-4y$	(19)
20.	$+4$	(8, 9)

Acceptable Score $\frac{15}{20}$

UNIT IV

TEACHER'S ANSWER KEY

PART II
Test B

FIRST YEAR ALGEBRA

1.	7	(25)
2.	$-\frac{1}{8}$	(25)
3.	$\frac{3}{4}$	(25)
4.	1	(25)
5.	One	(25)
6.	Zero	(25)
7.	Odd	(23)
8.	Even	(23)
9.	$-245y$	(23)
10.	$9a^2y$	(23)
11.	$-27y^3$	(23)
12.	False	(13)
13.	True	(13)
14.	$7x$	(19)
15.	$-12y$	(26)
16.	$8x + z$	(18)
17.	$-2x + 2y$	(19)
18.	$6a + 2b$	(26)
19.	$6x - 14y$	(19)
20.	1	(8, 9)

Acceptable Score $\frac{15}{20}$

UNIT IV

TEACHER'S ANSWER KEY

PART II
Test C

FIRST YEAR ALGEBRA

1.	$\frac{1}{3}$	(25)
2.	$-\frac{1}{5}$	(25)
3.	$\frac{13}{5}$	(25)
4.	$\frac{5}{6}$	(25)
5.	1	(25)
6.	0	(25)
7.	Positive	(23)
8.	Negative	(23)
9.	$-15xy$	(23)
10.	$-8b^3$	(23)
11.	$4c^2$	(23)
12.	False	(13)
13.	True	(13)
14.	$7y$	(19)
15.	$-8x$	(26)
16.	$9x - z$	(18)
17.	$x - y$	(19)
18.	$13c - 2b$	(26)
19.	y	(19)
20.	1	(8, 9)

Acceptable Score $\frac{15}{20}$

UNIT IV

TEACHER'S ANSWER KEY

PART II
Test D

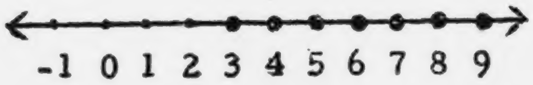
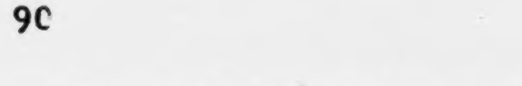
FIRST YEAR ALGEBRA

1.	$\frac{5}{2}$	(25)
2.	$-\frac{1}{6}$	(25)
3.	$\frac{7}{4}$	(25)
4.	$\frac{1}{5}$	(25)
5.	0	(25)
6.	1	(25)
7.	Positive	(23)
8.	Negative	(23)
9.	$-6xy$	(23)
10.	$16a^2$	(23)
11.	$-27a^3$	(23)
12.	False	(13)
13.	True	(13)
14.	$7x$	(19)
15.	$3y$	(26)
16.	$11x$	(18)
17.	$6x + 2y$	(19)
18.	$10a - b$	(26)
19.	$-4x - 3y$	(19)
20.	1	(8, 9)

Acceptable Score $\frac{24}{34}$

UNIT V **TEACHER'S ANSWER KEY** Test A

FIRST YEAR ALGEBRA

1.	A	(27)
2.	F	(27)
3.	H	(27)
4.	D	(27)
5.	True	(27)
6.	$\{3\}$	(28)
7.	$\{-12\}$	(28)
8.	$\{-7\}$	(28)
9.	$\{-\frac{9}{2}\}$	(28)
10.	$\{15\}$	(28)
11.	$\{3\}$	(29)
12.	$\{\frac{17}{5}\}$	(29)
13.	$\{-\frac{10}{3}\}$	(29)
14.	$\{-\frac{52}{15}\}$	(29)
15.	$\{\frac{36}{7}\}$	(29)
16.	$\{\frac{28}{3}\}$	(29)
17.	$\{-12\}$	(29)
18.	$\{\frac{30}{7}\}$	(29)
19.	$\{\frac{43}{2}\}$	(30)
20.	$\{\frac{11}{2}\}$	(30)
21.	$\{-2\}$	(30)
22.	$\{\frac{7}{2}\}$	(31)
23.	$\{\frac{8}{3}\}$	(30)
24.	$\{-\frac{55}{24}\}$	(30)
25.	$\{24\}$	(31)
26.	$\{5\}$	(27)
27.		(27)
28.	$b \leq -\frac{13}{6}$	(33)
29.	$d > 5$	(33)
30.	$a \leq \frac{9}{10}$	(33)
31.	$a < 12$	(33)
32.	$c \geq \frac{28}{3}$	(33)
33.		(33)
34.	90	

Acceptable Score $\frac{24}{34}$

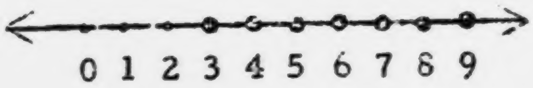
UNIT V

TEACHER'S ANSWER KEY

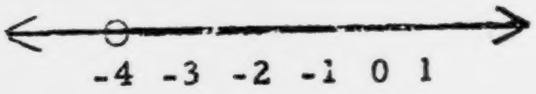
Test B

FIRST YEAR ALGEBRA

1. A (27)
2. B (27)
3. H (27)
4. G (27)
5. True (27)
6. $\{1\}$ (28)
7. $\{-11\}$ (28)
8. $\{-13\}$ (28)
9. $\{\frac{7}{2}\}$ (28)
10. $\{14\}$ (28)
11. $\{4\}$ (29)
12. $\{\frac{11}{5}\}$ (29)
13. $\{-\frac{20}{3}\}$ (29)
14. $\{-\frac{53}{15}\}$ (29)
15. $\{-\frac{37}{8}\}$ (29)
16. $\{-20\}$ (29)
17. $\{-16\}$ (29)
18. $\{\frac{15}{4}\}$ (29)
19. $\{\frac{43}{3}\}$ (30)
20. $\{4\}$ (30)
21. $\{-2\}$ (30)
22. $\{\frac{7}{2}\}$ (31)
23. $\{2\}$ (30)
24. $\{-\frac{49}{20}\}$ (30)
25. ϕ (31)
26. ϕ (27)
27. (27)



28. $b \leq -2$ (33)
29. $d > 13$ (33)
30. $a \leq -\frac{1}{10}$ (33)
31. $a < 18$ (33)
32. $c \leq 15$ (33)
33. (33)



34. \$3

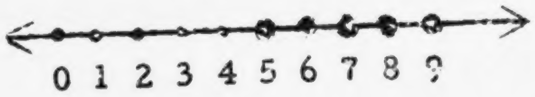
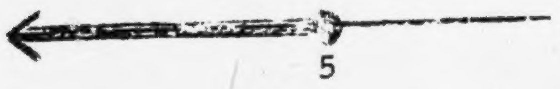
Acceptable Score $\frac{24}{34}$

UNIT V

TEACHER'S ANSWER KEY

Test C

FIRST YEAR ALGEBRA

1.	A	(27)
2.	F	(27)
3.	H	(27)
4.	D	(27)
5.	False	(27)
6.	{2}	(28)
7.	{-13}	(28)
8.	{-8}	(28)
9.	$\{-\frac{17}{2}\}$	(28)
10.	{20}	(28)
11.	{4}	(29)
12.	$\{\frac{19}{4}\}$	(29)
13.	$\{-\frac{18}{5}\}$	(29)
14.	{-4}	(29)
15.	$\{\frac{35}{6}\}$	(29)
16.	$\{\frac{27}{2}\}$	(29)
17.	{-35}	(29)
18.	$\{\frac{40}{7}\}$	(29)
19.	{26}	(30)
20.	$\{\frac{13}{3}\}$	(30)
21.	{-3}	(30)
22.	{3}	(31)
23.	$\{-\frac{1}{3}\}$	(30)
24.	$\{-\frac{7}{2}\}$	(30)
25.	$\{-\frac{13}{3}\}$	(31)
26.	ϕ	(27)
27.		(27)
28.	$a \leq -\frac{12}{5}$	(33)
29.	$b > 6$	(33)
30.	$x \leq \frac{11}{10}$	(33)
31.	$x < 18$	(33)
32.	$R \geq \frac{21}{2}$	(33)
33.		(33)
34.	40	

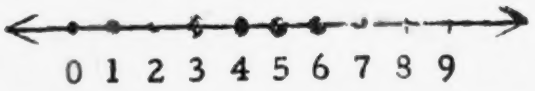
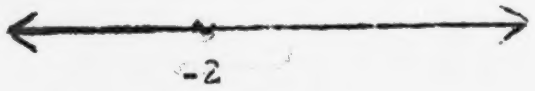
Acceptable Score $\frac{24}{34}$

UNIT V

TEACHER'S ANSWER KEY

Test D

FIRST YEAR ALGEBRA

1.	B	(27)
2.	D	(27)
3.	H	(27)
4.	G	(27)
5.	False	(27)
6.	$\{2\}$	(28)
7.	$\{-7\}$	(28)
8.	$\{-14\}$	(28)
9.	$\{\frac{17}{3}\}$	(28)
10.	$\{-11\}$	(28)
11.	$\{4\}$	(29)
12.	$\{\frac{11}{7}\}$	(29)
13.	$\{\frac{17}{4}\}$	(29)
14.	$\{-\frac{56}{15}\}$	(29)
15.	$\{-\frac{61}{5}\}$	(29)
16.	$\{-24\}$	(29)
17.	$\{-6\}$	(29)
18.	$\{\frac{14}{3}\}$	(29)
19.	$\{\frac{39}{2}\}$	(30)
20.	$\{11\}$	(30)
21.	$\{-3\}$	(30)
22.	$\{1\}$	(31)
23.	$\{\frac{9}{4}\}$	(30)
24.	$\{-\frac{41}{8}\}$	(30)
25.	$\{12\}$	(31)
26.	ϕ	(27)
27.		(27)
28.	$y \leq -2$	(33)
29.	$d > 12$	(33)
30.	$a \leq -\frac{1}{8}$	(33)
31.	$a < 42$	(33)
32.	$c \leq 16$	(33)
33.		(33)
34.	84	

Acceptable Score $\frac{25}{34}$

UNIT VI

TEACHER'S ANSWER KEY

Test A

FIRST YEAR ALGEBRA

1.	E, F, G	(34)
2.	C	(34)
3.	4	(34)
4.	3	(34)
5.	B	(34)
6.	A	(34)
7.	D	(34)
8.	B	(34)
9.	D	(35)
10.	A	(35)
11.	B	
12.	C	(36, 37)
13.	B	(36)
14.	B	(37)
15.	C	(38)
16.	A	(38)
17.	C	(37)
18.	D	(37)
19.	C	(36)
20.	C	(37)
21.	D	(36)
22.	D	(37)
23.	B	(40)
24.	C	(41)
25.	A	(41)
26.	D	(42)
27.	C	(42)
28.	A	(43)
29.	D	(44)
30.	A	(44)
31.	D	(44)
32.	1	(39)
33.	a	
34.	36	

Acceptable Score $\frac{25}{34}$

UNIT VI

TEACHER'S ANSWER KEY

Test B

FIRST YEAR ALGEBRA

1.	B, E, F, G, H	(34)
2.	C	(34)
3.	5	(34)
4.	5	(34)
5.	C	(34)
6.	B	(34)
7.	C	(34)
8.	B	(34)
9.	A	(35)
10.	C	(35)
11.	B	
12.	D	(36, 37)
13.	A	(36)
14.	C	(37)
15.	A	(38)
16.	A	(37)
17.	B	(37)
18.	B	(37)
19.	D	(36)
20.	A	(37)
21.	B	(36)
22.	A	(37)
23.	C	(40)
24.	B	(41)
25.	C	(41)
26.	D	(42)
27.	B	(42)
28.	C	(43)
29.	A	(44)
30.	C	(44)
31.	A	(44)
32.	a	
33.	1	(39)
34.	26	

Acceptable Score $\frac{25}{34}$

UNIT VI

TEACHER'S ANSWER KEY

Test C

FIRST YEAR ALGEBRA

1.	E, G, H.	(34)
2.	A	(34)
3.	4	(34)
4.	3	(34)
5.	C	(34)
6.	A	(34)
7.	C	(34)
8.	C	(34)
9.	D	(35)
10.	A	(35)
11.	C	
12.	C	(36, 37)
13.	C	(36)
14.	C	(37)
15.	B	(38)
16.	B	(38)
17.	B	(37)
18.	D	(37)
19.	D	(36)
20.	B	(37)
21.	A	(36)
22.	B	(37)
23.	D	(40)
24.	D	(41)
25.	D	(41)
26.	C	(42)
27.	C	(42)
28.	B	(43)
29.	A	(44)
30.	D	(44)
31.	D	(44)
32.	1	(39)
33.	x	
34.	36	

Acceptable Score $\frac{25}{34}$

UNIT VI

TEACHER'S ANSWER KEY

Test D

FIRST YEAR ALGEBRA

1.	B, F, G	(34)	18.	C	(37)
2.	A	(34)	19.	D	(36)
3.	5	(34)	20.	A	(37)
4.	4	(34)	21.	B	(36)
5.	C	(34)	22.	D	(37)
6.	B	(34)	23.	B	(40)
7.	A	(34)	24.	C	(41)
8.	D	(34)	25.	D	(41)
9.	B	(35)	26.	B	(42)
10.	C	(35)	27.	A	(42)
11.	A		28.	C	(43)
12.	B	(36, 37)	29.	B	(44)
13.	C	(36)	30.	A	(44)
14.	A	(37)	31.	D	(44)
15.	C	(38)	32.	a	
16.	B	(38)	33.	1	(39)
17.	B	(37)	34.	15, 16, 17	(39)

Acceptable Score $\frac{20}{28}$

UNIT VII TEACHER'S ANSWER KEY Test A

FIRST YEAR ALGEBRA

1.	A, C	(45)
2.	$2^3 \cdot 3^2$	(45)
3.	$2xy^3$	(45)
4.	6	(45)
5.	$2x^2y$	(45)
6.	$12(3x + y - 2)$	(46)
7.	$5x(5x^2 - 3x - 1)$	(46)
8.	$(x - 4)(x + 4)$	(48)
9.	$(a + 4)^2$	(51)
10.	$(b + 6)(b - 2)$	(52)
11.	$(3c - 2)(2c + 1)$	(53)
12.	$(x^2 + 7)(x - 3)$	(46)
13.	$(5x - 9y)(5x + 9y)$	(48)
14.	$2a(a + 5)^2$	(54)
15.	$2(x + 2)(x - 2)$	(54)
16.	$-1(x - 1)^2$	(54)
17.	$-4x^2 + 5x + 7$	(57)
18.	0	(55)
19.	$-x^2 + 3x - 1$	(57)
20.	$\{-1, 2\}$	(55)
21.	$\{0, 2\}$	(55)
22.	$\{-\frac{1}{2}, 3\}$	(55)
23.	$\{-5, 5\}$	(56)
24.	$\{3\}$	(56)
25.	$\{-5, 2\}$	(56)
26.	{any number}	(55)
27.	{ }	(55)
28.	$4x + 3(20 + x)$ or $7x + 60$	

Acceptable Score $\frac{20}{28}$

UNIT VII

TEACHER'S ANSWER KEY

Test B

FIRST YEAR ALGEBRA

1. B (45)
2. $2^2 \cdot 17$ (45)
3. $5xy^4$ (45)
4. 6 (45)
5. $3x^3y^4$ (45)
6. $9(x - 2y + 3)$ (46)
7. $(x - 5)(x + 5)$ (48)
8. $3x(x - 7)(x + 2)$ (46)
9. $(a + 6)^2$ (51)
10. $(b + 4)(b - 3)$ (52)
11. $3(2d - 1)(d + 1)$ (54)
12. $(x^2 + 3)(x - 7)$ (46)
13. $(3x - 8y)(3x + 8y)$ (48)
14. $3a(a^2 + 7a - 16)$ (46)
15. $3(x + 3)(x - 3)$ (54)
16. $-1(x - 3)(x + 2)$ (54)
17. 0 (55)
18. $-2x^2 + 5x + 2$ (57)
19. $6x^2 - 5x - 4$ (57)
20. $\{-4, 3\}$ (55)
21. $\{\frac{1}{2}, 4\}$ (55)
22. $\{0, 3\}$ (55)
23. $\{-4, 4\}$ (56)
24. $\{5\}$ (56)
25. $\{-3, -2\}$ (56)
26. {any number} (55)
27. { } (55)
28. 12, 13, 14

Acceptable Score $\frac{20}{28}$

UNIT VII

TEACHER'S ANSWER KEY

Test C

FIRST YEAR ALGEBRA

1.	B	(45)
2.	$2^2 \cdot 3 \cdot 7$	(45)
3.	$2a^2b^3$	(45)
4.	3	(45)
5.	$3a^2b$	(45)
6.	$6(3x + 2y - 4)$	(46)
7.	$5x(4x^2 - 3x + 1)$	(46)
8.	$(x - 9)(x + 9)$	(48)
9.	Prime	(51)
10.	$(r + 10)(r - 3)$	(52)
11.	$(5y - 2)(3y + 1)$	(53)
12.	$(a^2 + 5)(a - 3)$	(46)
13.	$9(2r - 3s)(2r + 3s)$	(48)
14.	$x(x - 1)^2$	(54)
15.	$4(c + 2)(c - 2)$	(54)
16.	$-1(a - 1)^2$	(54)
17.	$-6a^2 + 3a + 1$	(57)
18.	0	(55)
19.	$-y^2 + 5y - 3$	(57)
20.	$\{-1, 3\}$	(55)
21.	$\{0, 10\}$	(55)
22.	$\{-\frac{3}{2}, 1\}$	(55)
23.	$\{-9, 9\}$	(56)
24.	$\{-1, 6\}$	(56)
25.	$\{-6, 1\}$	(56)
26.	{any number}	(55)
27.	{ }	(55)
28.	t = 3 hours	

Acceptable Score $\frac{20}{28}$

UNIT VII **TEACHER'S ANSWER KEY** Test D

FIRST YEAR ALGEBRA

1.	A, B	(45)
2.	$2^3 \cdot 7$	(45)
3.	$4xy^4$	(45)
4.	8	(45)
5.	$3x^2y^2$	(45)
6.	$5(5x + y - 2z)$	(46)
7.	$12x(3x^2 + 2x + 1)$	(46)
8.	$(x - 6)(x + 6)$	(48)
9.	$(y + 3)^2$	(51)
10.	$(b + 7)(b - 2)$	(52)
11.	$(3c + 2)(2c - 1)$	(53)
12.	$(x^2 + 2)(x - 5)$	(46)
13.	$(7x + 9y)(7x - 9y)$	(48)
14.	$4a(a + 5)^2$	(54)
15.	$3(x + 3)(x - 3)$	(54)
16.	$-1(x + 1)^2$	(54)
17.	$9x^2 - 3x + 6$	(57)
18.	$-x^2 - 6x + 7$	(57)
19.	0	(55)
20.	$\{-6, 7\}$	(55)
21.	$\{0, 3\}$	(55)
22.	$\{-\frac{2}{3}, 3\}$	(55)
23.	$\{-9, 9\}$	(56)
24.	$\{-5\}$	(56)
25.	$\{-4, 9\}$	(56)
26.	$\{\ \}$	(55)
27.	{any number}	(55)
28.	4	

Acceptable Score $\frac{18}{25}$

UNIT VIII

TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

PART I
Test A

1.	$\{0\}$	(58)
2.	$\{3\}$	(58)
3.	$\{-2\}$	(58)
4.	None	(58)
5.	$\{2, -2\}$	(58)
6.	Quotient	(58)
7.	Numerator	(58)
8.	$\frac{6}{7}$	(59)
9.	$\frac{4a}{5b}$	(59)
10.	$\frac{16x}{3y}$	(59)
11.	$\frac{1}{x - 3}$	(59)
12.	$\frac{x + 1}{x - 2}$	(59)
13.	done	(59)
14.	$\frac{2x}{y}$	(61)
15.	$\frac{15x^2}{2}$	(61)
16.	$\frac{56x}{-5}$	(61)
17.	$(a - b)(m - n)$	(61)
18.	1	(61)
19.	$-\frac{10}{9}$	(62)
20.	$\frac{3}{16y}$	(62)
21.	$\frac{14xy^2}{5}$	(62)
22.	$\frac{6b}{5a}$	(62)
23.	$\frac{3}{(x - y)(x + 3)}$	(62)
24.	$\frac{3}{a + 2}$	(63)
25.	\$22; \$14	

Acceptable Score $\frac{18}{25}$

UNIT VIII

TEACHER'S ANSWER KEY

PART I
Test B

FIRST YEAR ALGEBRA

1.	$\{-1\}$	(58)
2.	$\{2\}$	(58)
3.	$\{0\}$	(58)
4.	$\{5, -5\}$	(58)
5.	None	(58)
6.	Quotient	(58)
7.	Denominator	(58)
8.	$\frac{8}{9}$	(59)
9.	$\frac{3b}{4a}$	(59)
10.	$\frac{9yz}{2}$	(59)
11.	$\frac{1}{x - 5}$	(59)
12.	$\frac{x + 2}{x - 3}$	(59)
13.	Done	(59)
14.	$\frac{y}{2x}$	(61)
15.	$\frac{4x^2}{3}$	(61)
16.	$\frac{x}{-3}$	(61)
17.	$\frac{1}{(x + y)(a + b)}$	(61)
18.	$\frac{c + 2}{c + 4}$	(61)
19.	$-\frac{25}{27}$	(62)
20.	$\frac{1}{7y}$	(62)
21.	$\frac{14xy^2}{5}$	(62)
22.	$\frac{b}{a}$	(62)
23.	$\frac{4}{x + 2y}$	(62)
24.	$\frac{5}{x}$	(63)
25.	9, 11	

Acceptable Score $\frac{18}{25}$

UNIT VIII

TEACHER'S ANSWER KEY

PART I
Test C

FIRST YEAR ALGEBRA

1.	$\{2\}$	(58)
2.	$\{-4\}$	(58)
3.	$\{0\}$	(58)
4.	$\{3, -3\}$	(58)
5.	None	(58)
6.	Numerator	(58)
7.	True	(58)
8.	$\frac{19}{25}$	(59)
9.	$\frac{9ab}{4}$	(59)
10.	$\frac{y}{3x^2z^2}$	(59)
11.	Done	(59)
12.	$\frac{1}{x + 7}$	(59)
13.	$\frac{c + 3}{c - 3}$	(59)
14.	$6y^2$	(61)
15.	$\frac{3a^2}{b}$	(61)
16.	$-\frac{45}{4}$	(61)
17.	$\frac{3a}{a - 1}$	(61)
18.	1	(61)
19.	$\frac{-5}{28}$	(62)
20.	$\frac{7x}{16yz}$	(62)
21.	$\frac{27x^2y^2}{2}$	(62)
22.	$9ab^2$	(62)
23.	$\frac{x + 1}{x - 2}$	(62)
24.	$\frac{10}{x + 10}$	(63)
25.	500 seconds	

Acceptable Score $\frac{18}{25}$

UNIT VIII

TEACHER'S ANSWER KEY

PART I
Test D

FIRST YEAR ALGEBRA

1. $\{0\}$ (58)
2. $\{3\}$ (58)
3. $\{-2\}$ (58)
4. None (58)
5. $\{2, -2\}$ (58)
6. Quotient (58)
7. Denominator (58)
8. $\frac{4}{7}$ (59)
9. $\frac{2x}{3y}$ (59)
10. $\frac{12a}{5c}$ (59)
11. $\frac{1}{x - 2}$ (59)
12. $\frac{p - 3}{p + 4}$ (59)
13. Done (59)
14. $\frac{4y}{x}$ (61)
15. $\frac{15z^2}{2}$ (61)
16. $-\frac{40a}{7}$
17. $(x - y)(w - v)$ (61)
18. $(a - 4)^2$ (61)
19. $-\frac{5}{6}$ (62)
20. $\frac{1}{7y}$ (62)
21. $\frac{32xy^2}{5}$ (62)
22. $\frac{375z^5}{98w^3}$ (62)
23. $\frac{3}{(a - b)(a + 3)}$ (62)
24. $\frac{4(x + 1)(x + 3)}{3x}$ (63)
25. $w = 7$ $l = 15$

Acceptable Score $\frac{14}{21}$

UNIT VIII

TEACHER'S ANSWER KEY

PART II
Test A

FIRST YEAR ALGEBRA

1. $\frac{7}{9}$ (64)
2. $\frac{x - 3}{5}$ (64)
3. $\frac{4a - 2}{b}$ (64)
4. $\frac{41}{28}$ (65)
5. $\frac{23a}{20}$ (65)
6. $a + 2$ (65)
7. $x + 5$ (65)
8. $\frac{7b - 3a}{a^2b^2}$ (65)
9. $\frac{5x - 36}{x^2 - 81}$ (65)
10. $\frac{2x^2 - 4x - 7}{(x-4)(x+2)(x-1)}$ (65)
11. y (67)
12. $\frac{a + b}{a - b}$ (67)
13. 1:2 (60)
14. $\{\frac{5}{3}\}$ (68)
15. $\{\frac{8}{3}\}$ (68)
16. $\{-8\}$ (68)
17. $\{c > 12\}$ (68)
18. $\{y > \frac{22}{7}\}$ (68)
19. $\{\frac{8}{3}\}$ (69)
20. ϕ (69)
21. $\{-1\}$ (69)

Acceptable Score $\frac{14}{21}$

UNIT VIII

TEACHER'S ANSWER KEY

PART II
Test B

FIRST YEAR ALGEBRA

1.	$\frac{6}{7}$	(64)
2.	$\frac{x - 5}{8}$	(64)
3.	$\frac{3b - 3}{c}$	(64)
4.	$\frac{38}{45}$	(65)
5.	$\frac{43a}{30}$	(65)
6.	$x + 3$	(65)
7.	$x + 6$	(65)
8.	$\frac{5b + 2a}{a^2b^2}$	(65)
9.	$\frac{4x - 21}{x^2 - 49}$	(65)
10.	$\frac{2x^2 - 6x - 4}{(x - 4)(x + 1)(x - 2)}$	(65)
11.	y	
12.	$\frac{A - B}{A + B}$	(67)
13.	1:2	(60)
14.	$\{\frac{5}{3}\}$	(68)
15.	$\{\frac{5}{2}\}$	(68)
16.	$\{-15\}$	(68)
17.	$\{c > \frac{20}{3}\}$	(68)
18.	$\{y > \frac{110}{41}\}$	(68)
19.	$\{-\frac{5}{4}\}$	(69)
20.	ϕ	(69)
21.	$\{1\}$	(69)

Acceptable Score $\frac{14}{21}$

UNIT VIII

TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

PART II
Test C

1. $\frac{7}{9}$ (64)
2. $\frac{x - 5}{8}$ (64)

1

3. $\frac{4a - 2}{b}$ (64)
4. $\frac{38}{45}$ (65)
5. $\frac{23a}{20}$ (65)
6. $x + 3$ (65)
7. $x + 5$ (65)
8. $\frac{5b + 2a}{a^2b^2}$ (65)
9. $\frac{5x - 36}{x^2 - 81}$ (65)
10. $\frac{2x^2 - 6x - 4}{(x - 4)(x + 1)(x - 2)}$ (65)
11. y (67)
12. $\frac{A - B}{A + B}$ (67)
13. 1:2 (60)
14. $\{\frac{5}{3}\}$ (68)
15. $\{\frac{8}{3}\}$ (68)
16. $\{-15\}$ (68)
17. $\{c > 12\}$ (68)
18. $\{x > \frac{110}{41}\}$ (68)
19. $\{\frac{8}{3}\}$ (69)
20. ϕ (69)
21. $\{-1\}$ (69)

Acceptable Score $\frac{14}{21}$

UNIT VIII

TEACHER'S ANSWER KEY

PART II
Test D

FIRST YEAR ALGEBRA

1.	$\frac{6}{7}$	(64)
2.	$\frac{x - 3}{5}$	(64)
3.	$\frac{3b - 3}{c}$	(64)
4.	$\frac{41}{28}$	(65)
5.	$\frac{43a}{30}$	(65)
6.	$a + 2$	(65)
7.	$x + 6$	(65)
8.	$\frac{7b - 3a}{a^2b^2}$	(65)
9.	$\frac{4x - 21}{x^2 - 49}$	(65)
10.	$\frac{2x^2 - 4x - 7}{(x - 4)(x + 2)(x - 1)}$	(65)
11.	y	(67)
12.	$\frac{m + n}{m - n}$	(67)
13.	1:3	(60)
14.	$\{\frac{5}{3}\}$	(68)
15.	$\{\frac{5}{2}\}$	(68)
16.	$\{-8\}$	(68)
17.	$\{c > \frac{20}{3}\}$	(68)
18.	$\{y > \frac{20}{7}\}$	(68)
19.	$\{-\frac{5}{4}\}$	(69)
20.	ϕ	(69)
21.	$\{1\}$	(69)

Acceptable Score $\frac{22}{28}$

UNIT IX

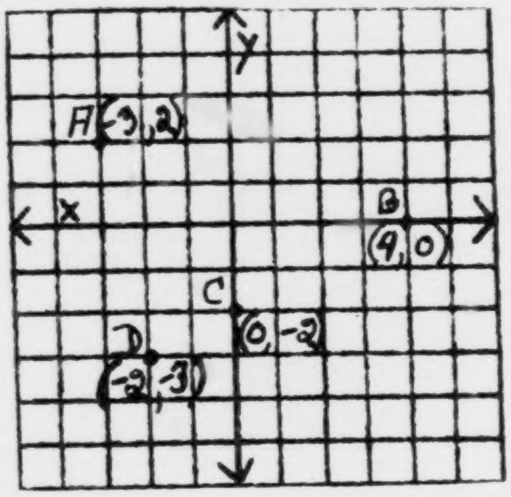
TEACHER'S ANSWER KEY

PART I
Test A

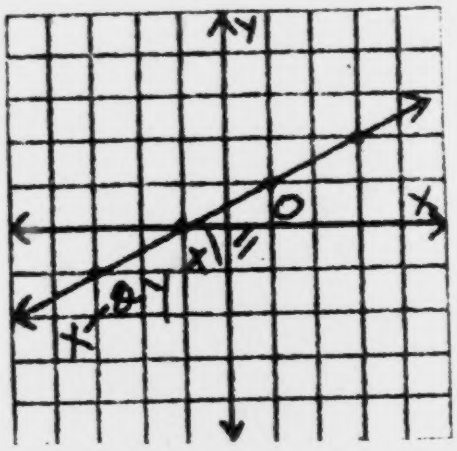
FIRST YEAR ALGEBRA

1.	A	(70, 71)
2.	F	(70, 71)
3.	D	(70, 71)
4.	C	(70, 71)
5.	G	(70, 71)
6.	E	(70, 71)
7.	B	(70, 71)
8.	B	(71)
9.	E	(71)
10.	True	(71)
11.	True	(71)
12.	False	(71)
13.	2	
14.	$y = \frac{3}{2}x - \frac{1}{2}$	(72)
15.	$y = x + \frac{1}{2}$,	(72)
16.	$y = -\frac{7}{3}x + \frac{4}{3}$	(72)
17.	$\frac{22}{3}$	(72)

18. (72)



19. (72)

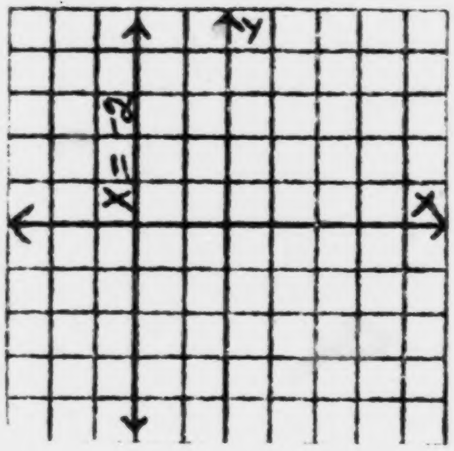


x	-3	-1	+3
y	-1	0	2

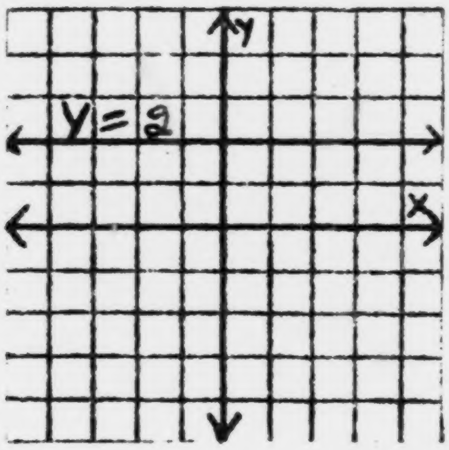
20. 3 (74)

21. $\frac{3}{2}$ (74)

22. (72)



23. (72)



24. y = 0 (72)

25. A, D (72)

26. -1 (73)

27. $\frac{9}{8}$ (73)

28. A (73)

Acceptable Score $\frac{22}{28}$

UNIT IX

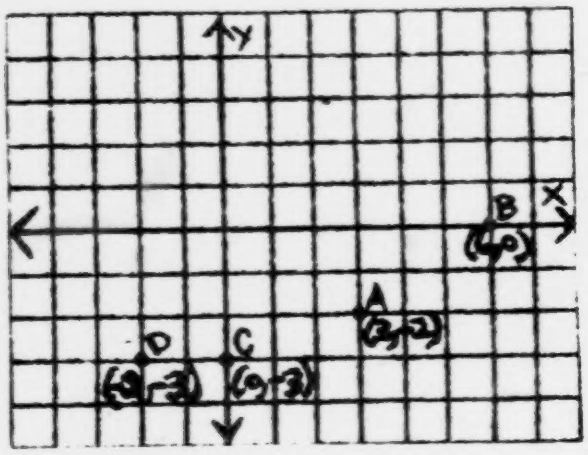
TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

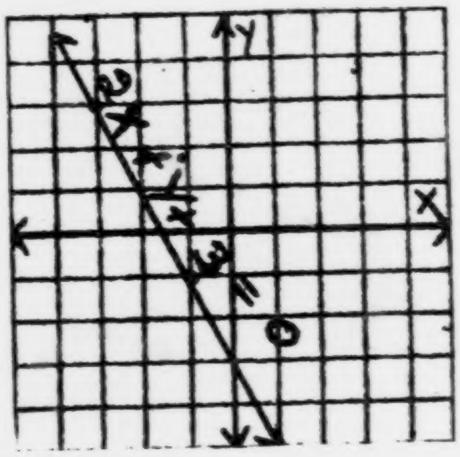
PART I
Test B

1.	B	(70,71)
2.	G	(70,71)
3.	C	(70,71)
4.	E	(70,71)
5.	J	(70,71)
6.	A	(70,71)
7.	I	(70,71)
8.	D	(71)
9.	E	(71)
10.	False	(71)
11.	True	(71)
12.	False	(71)
13.	1	
14.	$y = \frac{3}{4}x - \frac{1}{4}$	(72)
15.	$y = -\frac{3}{2}x$	(72)
16.	$y = -\frac{8}{3}x$	(72)
17.	4	(72)

18. (72)



19. (72)

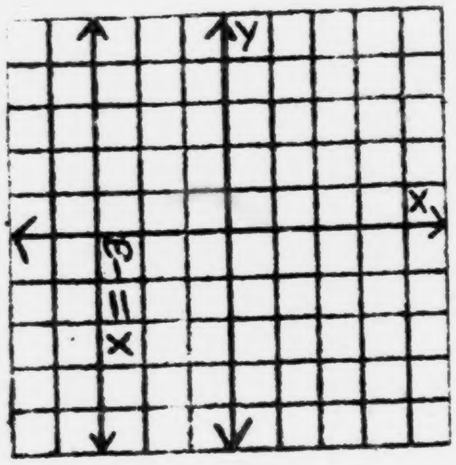


x	-3	-1	3
y	3	-1	-9

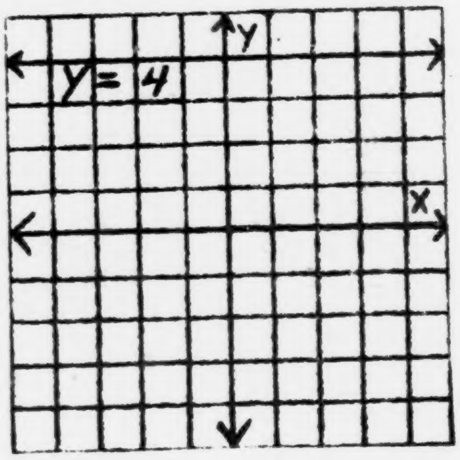
20. 2 (74)

22. -2 (74)

22. (72)



23. (72)



24. x = 0 (72)

25. A, D (72)

26. $\frac{3}{2}$ (73)

27. $-\frac{5}{2}$ (73)

28. A (73)

Acceptable Score $\frac{22}{28}$

UNIT IX

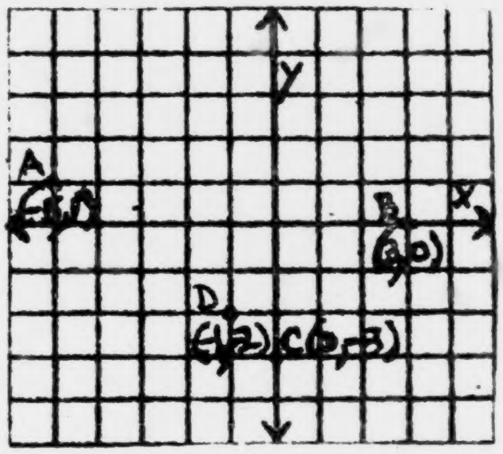
TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

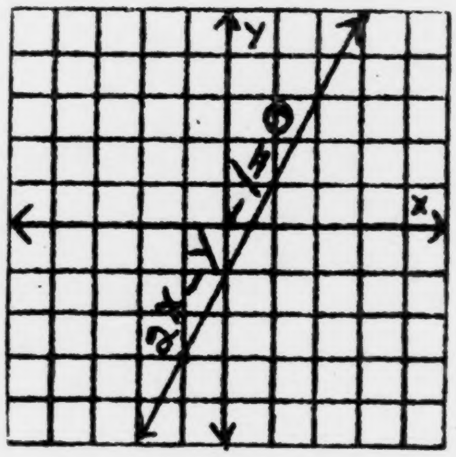
PART I
Test C

1.	C	(70,71)
2.	E	(70,71)
3.	D	(70,71)
4.	A	(70,71)
5.	F	(70,71)
6.	I	(70,71)
7.	B	(70,71)
8.	D	(71)
9.	E	(71)
10.	True	(71)
11.	True	(71)
12.	False	(71)
13.	3	
14.	$y = \frac{2}{3}x + \frac{1}{3}$	(72)
15.	$y = x + \frac{1}{3}$.	(72)
16.	$y = -\frac{10}{3}x + \frac{4}{3}$	(72)
17.	9	(72)

18. (72)



19. (72)

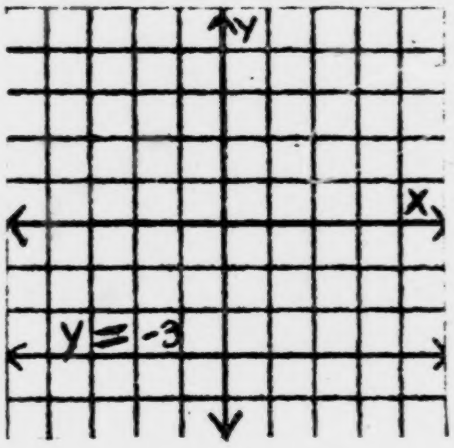


x	-3	-1	3
y	-7	-3	5

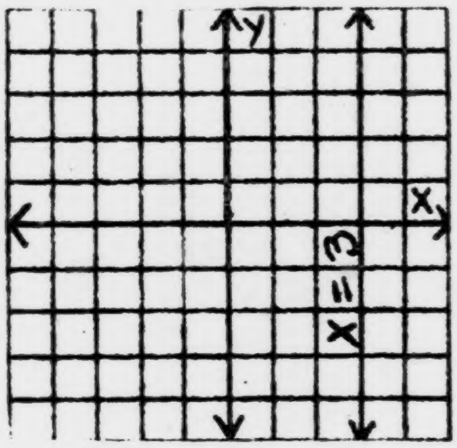
20. 3 (74)

21. $\frac{5}{3}$ (74)

22. (72)



23. (72)



24. x = 0 (72)

25. A, C (72)

26. $-\frac{6}{5}$ (73)

27. $\frac{10}{9}$ (73)

28. C (73)

Acceptable Score $\frac{22}{28}$

UNIT IX

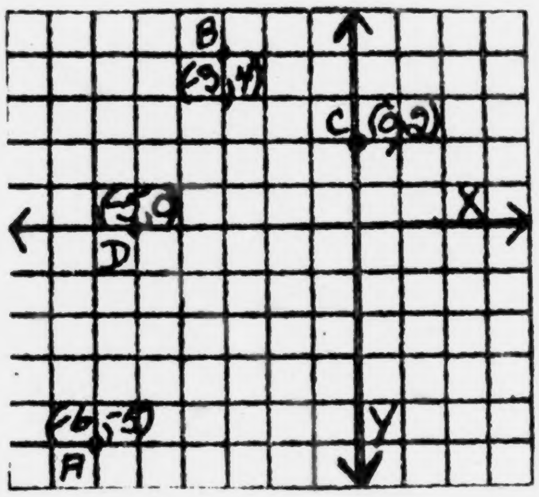
TEACHER'S ANSWER KEY

FIRST YEAR ALGEBRA

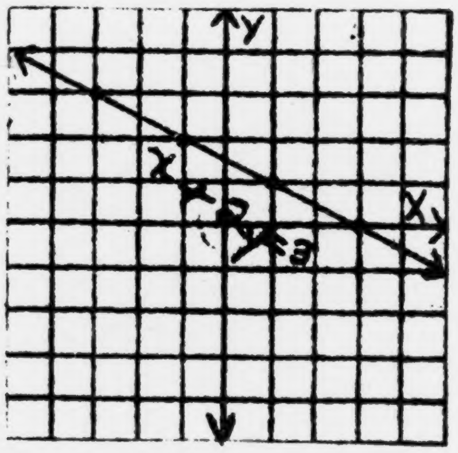
PART I
Test D

1.	B	(70,71)
2.	A	(70,71)
3.	J	(70,71)
4.	D	(70,71)
5.	E	(70,71)
6.	H	(70,71)
7.	G	(70,71)
8.	E	(71)
9.	C	(71)
10.	False	(71)
11.	True	(71)
12.	False	(71)
13.	4	
14.	$y = \frac{6}{5}x - \frac{1}{5}$	(72)
15.	$y = \frac{3}{2}x + \frac{5}{2}$	(72)
16.	$y = -\frac{9}{4}x + \frac{9}{4}$	(72)
17.	13	(72)

18. (72)



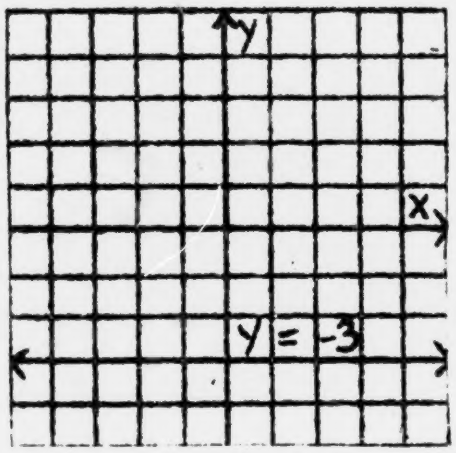
19. (72)



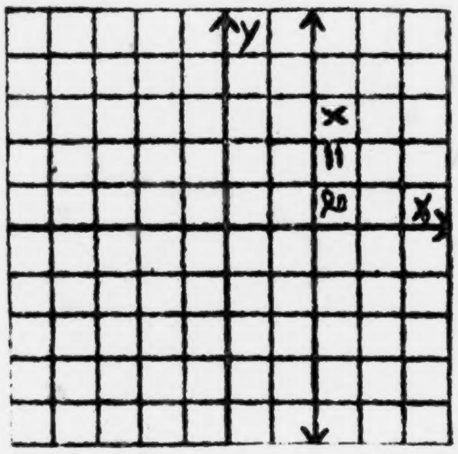
x	-3	-1	3
y	3	2	0

20.	2	(74)
21.	$\frac{4}{5}$	(74)

22. (72)



23. (72)



24. True (72)

25. A, C (72)

26. $-\frac{1}{2}$ (73)

27. 5 (73)

28. C (73)

Acceptable Score $\frac{15}{21}$

UNIT IX

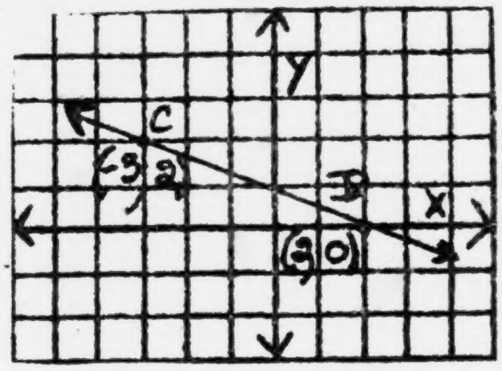
TEACHER'S ANSWER KEY

PART II
Test A

FIRST YEAR ALGEBRA

1. Negative (73)

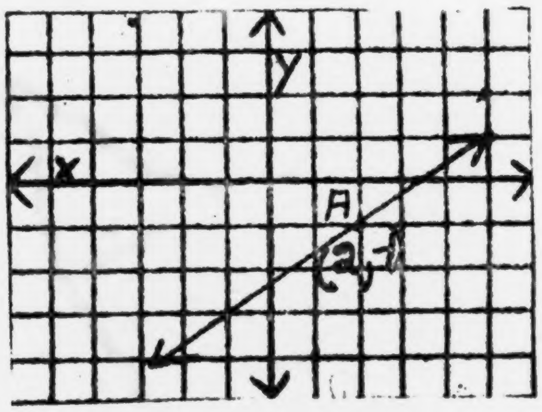
2. (72)



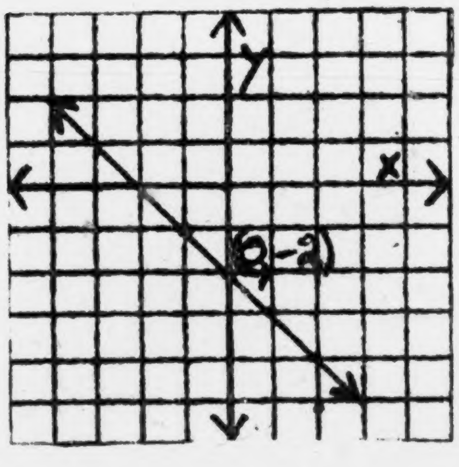
3. m = 3 (74)

4. m = $-\frac{3}{2}$ (74)

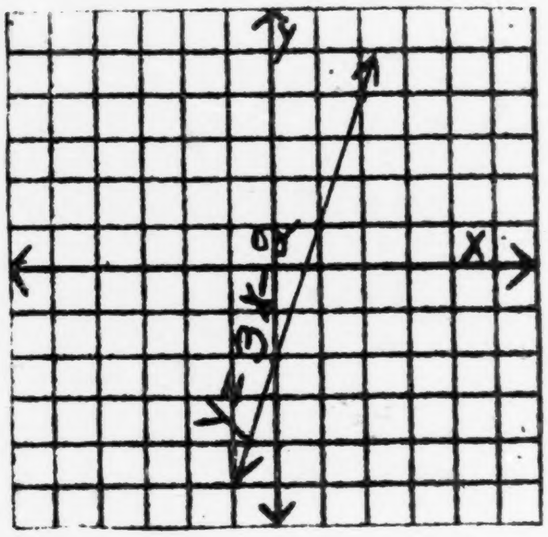
5. (74)



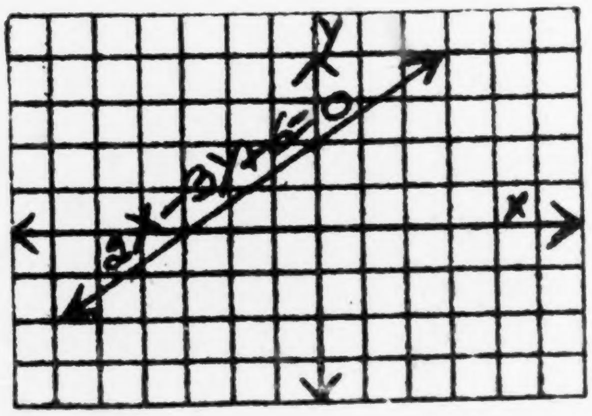
6. (74)



7. (74)



8. (74)

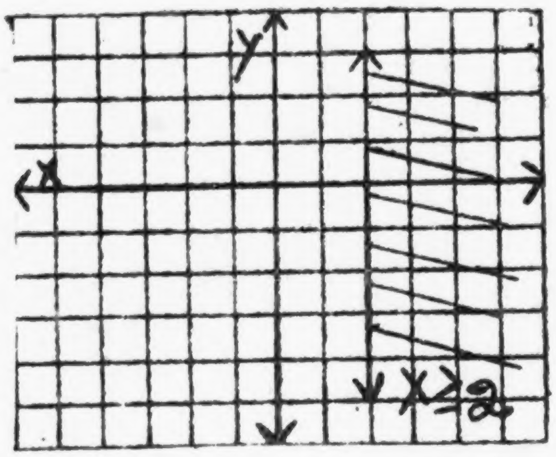


9. y = -2x + 1 (75)

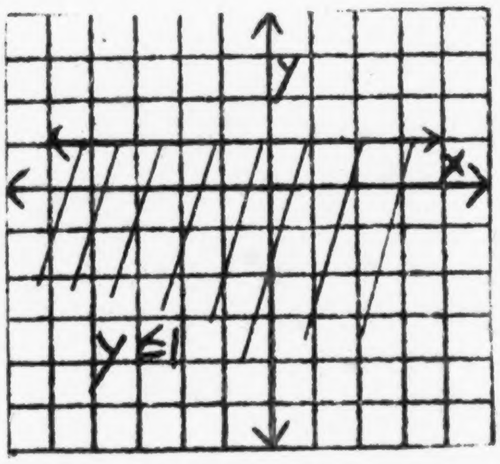
10. y = 3x - 5 (75)

11. y = -x - 1 (75)

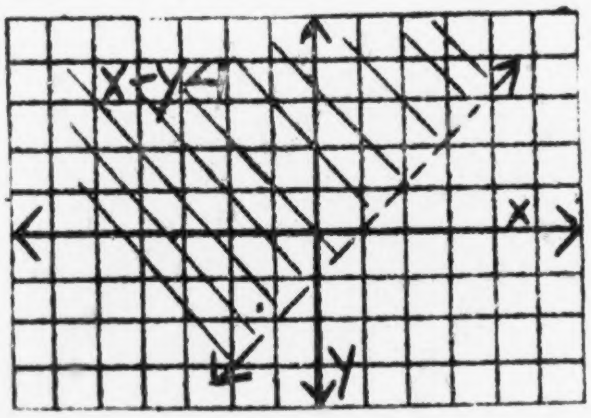
12. (76)



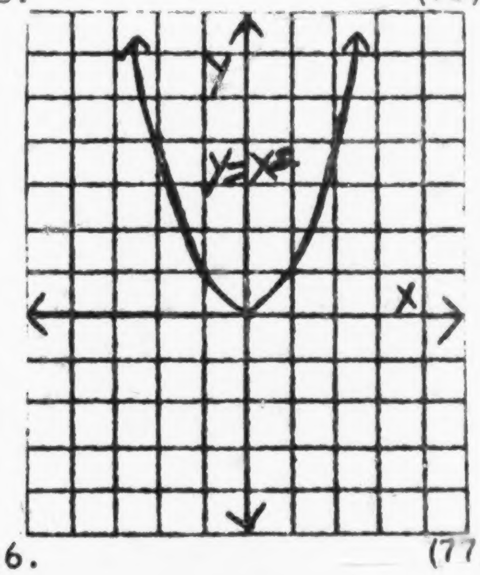
13. (76)



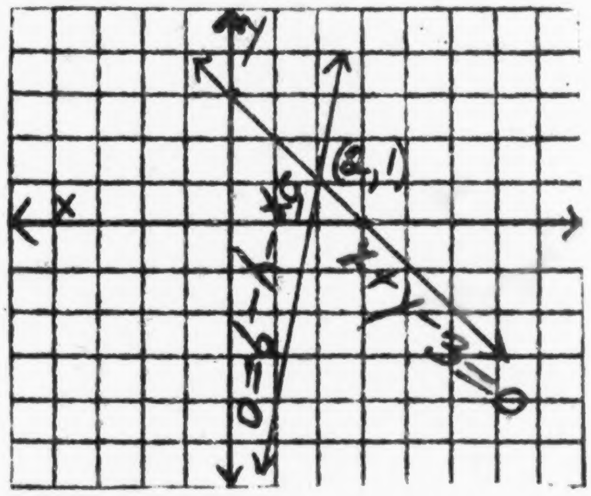
14.



15. (76)



16. (77)



{(2,1)}

17. {(-2,5)} (78,79,80)

18. {(-3,-2)} (78,79,80)

19. 22 (81)

20. -7 (81)

21. y (81)

Acceptable Score $\frac{15}{21}$

UNIT IX

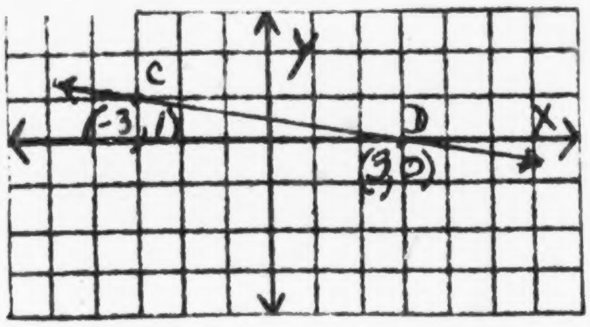
TEACHER'S ANSWER KEY

PART II
Test B

FIRST YEAR ALGEBRA

1. Positive (73)

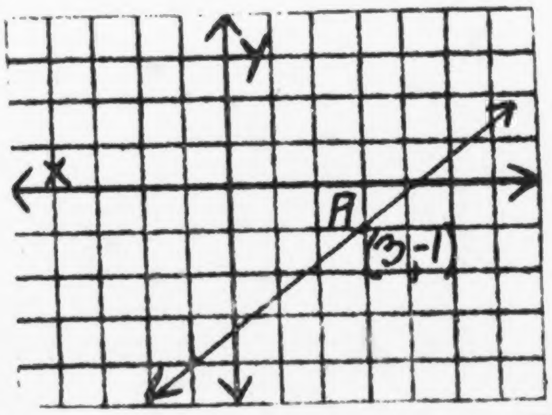
2. (72)



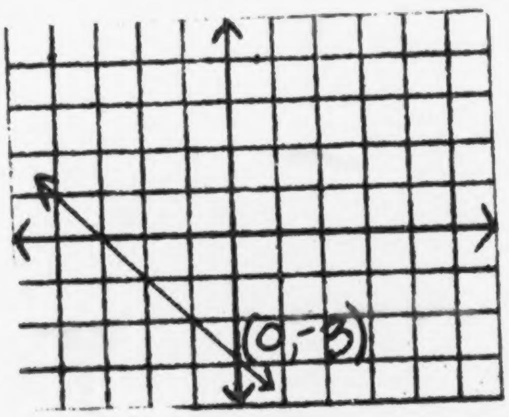
3. m = 5 (74)

4. m = $-\frac{4}{3}$ (74)

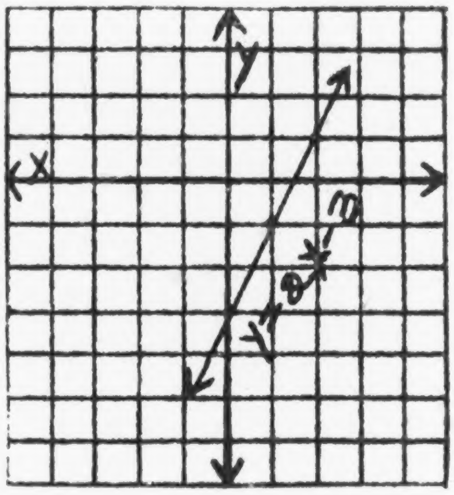
5. (74)



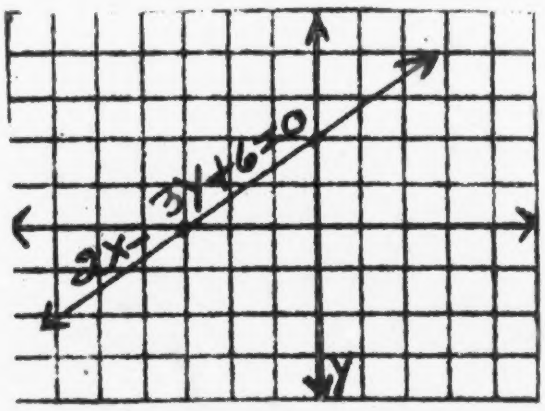
6. (7.4)



7. (74)



8. (74)

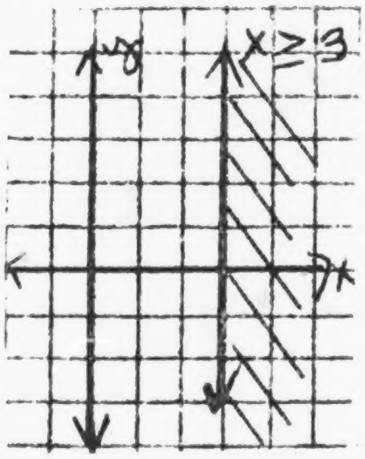


9. y = -2x + 2 (75)

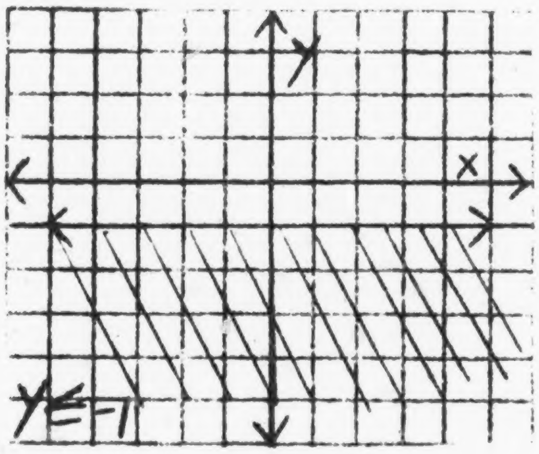
10. y = 3x - 8 (75)

11. y = -x - 1 (75)

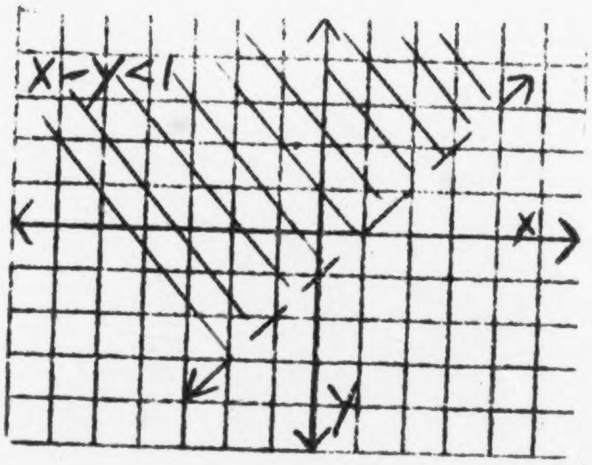
12. (76)



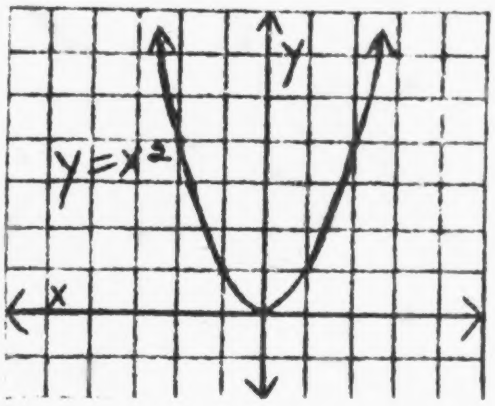
13. (76)



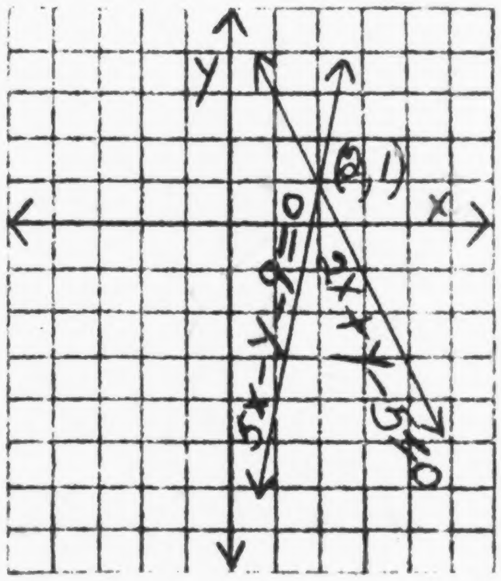
14. (76)



15. (76)



16. (77)



{(2,1)}

17. {(2,3)} (78,79,80)

18. {(-3,-2)} (78,79,80)

19. 48 (81)

20. -9 (81)

21. y (81)

Acceptable Score $\frac{15}{21}$

UNIT IX

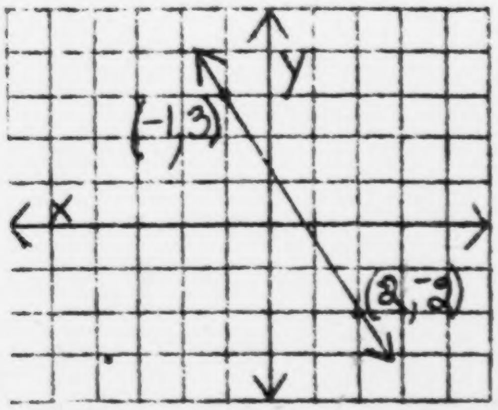
TEACHER'S ANSWER KEY

PART II
Test C

FIRST YEAR ALGEBRA

1. Negative (73)

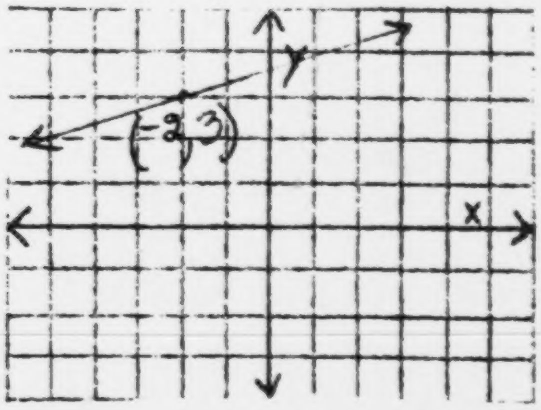
2. (72)



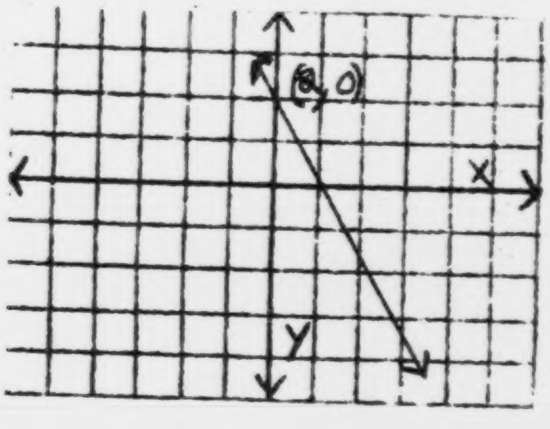
3. $m = -2$ (74)

4. $m = -\frac{5}{3}$ (74)

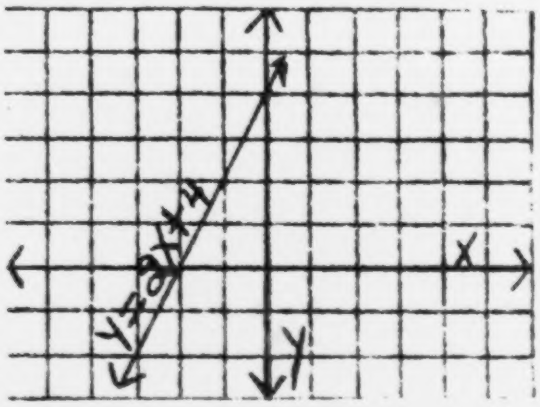
5. (74)



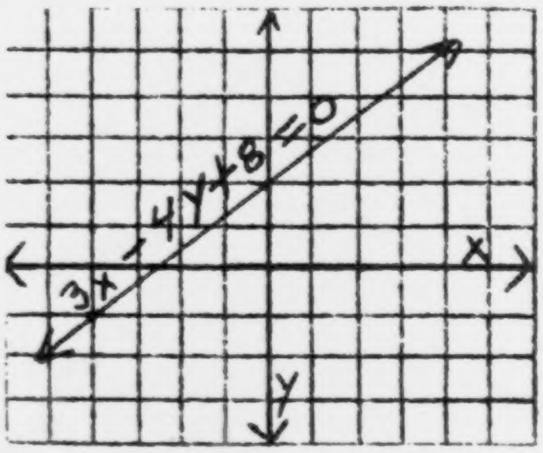
6. (74)



7. (74)



8. (74)

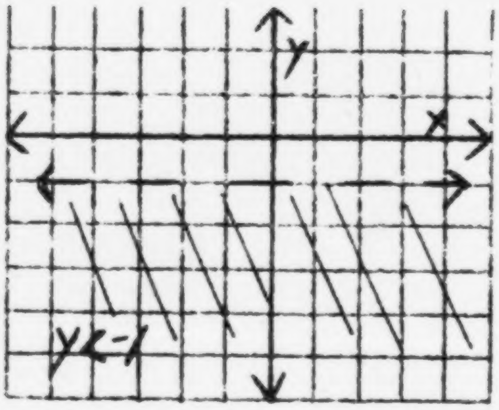


9. $y = 4x - 3$ (75)

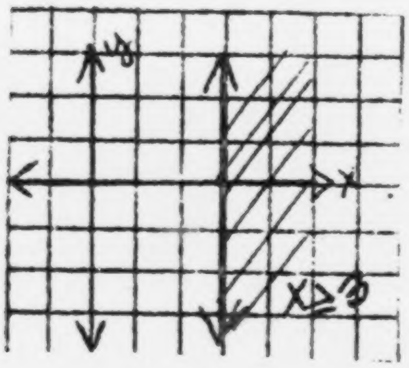
10. $y = -2x + 5$ (75)

11. $y = 2x - 2$ (75)

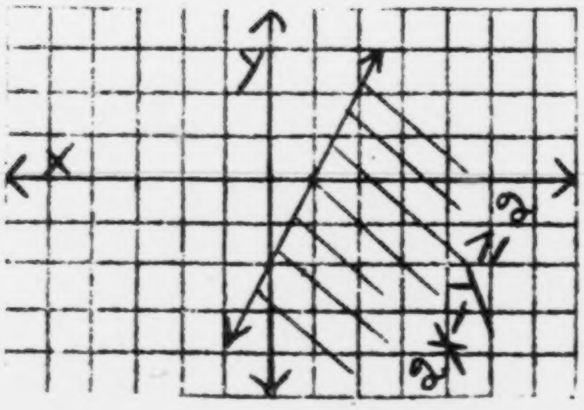
12. (76)



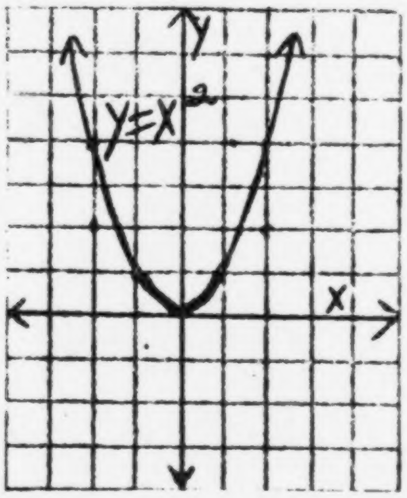
13. (76)



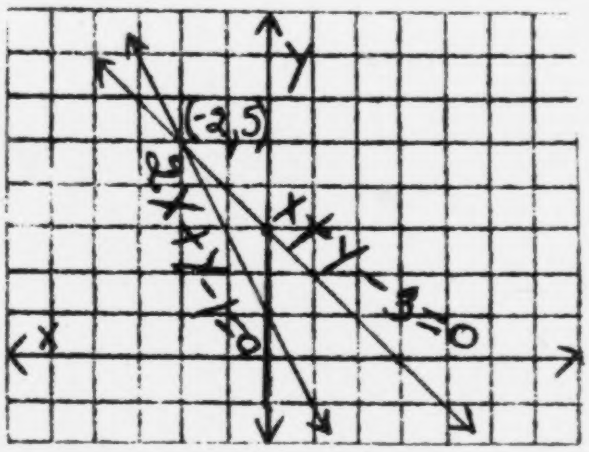
14. (76)



15. (74)



16. (77)



{(-2, 5)}

17. {(17,11)} (78,79,80)

18. {(3,-2)} (78,79,80)

19. 12 (81)

20. -14 (81)

21. x (81)

Acceptable Score $\frac{15}{21}$

UNIT IX

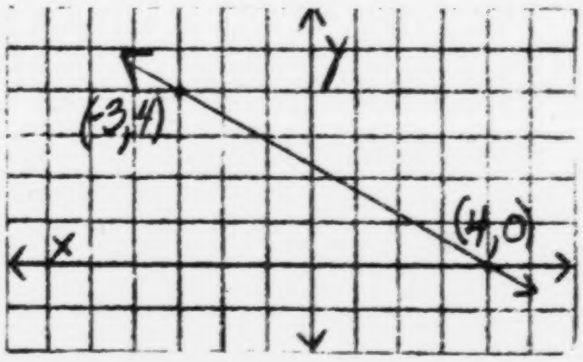
TEACHER'S ANSWER KEY

PART II
Test D

FIRST YEAR ALGEBRA

1. Positive (73)

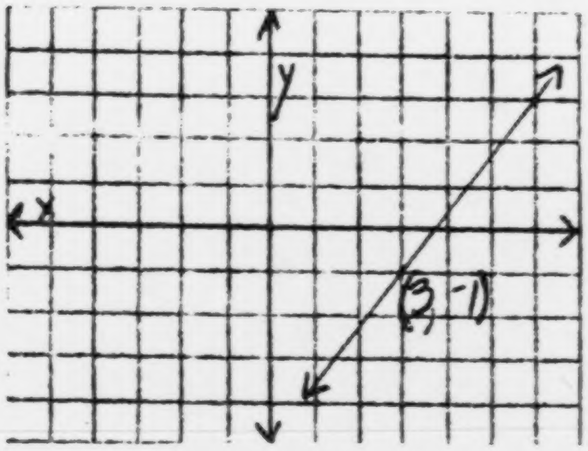
2. (72)



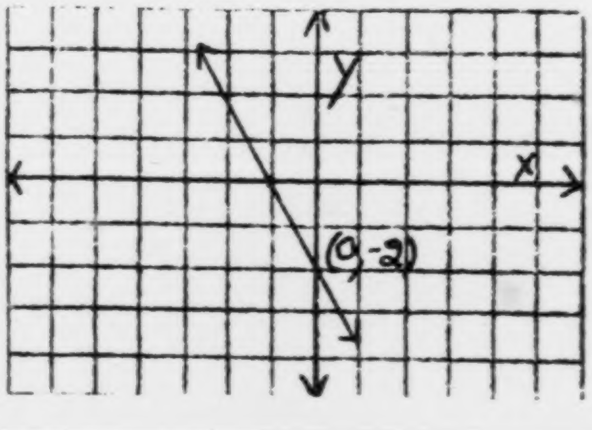
3. m = 7 (74)

4. m = $-\frac{3}{5}$ (74)

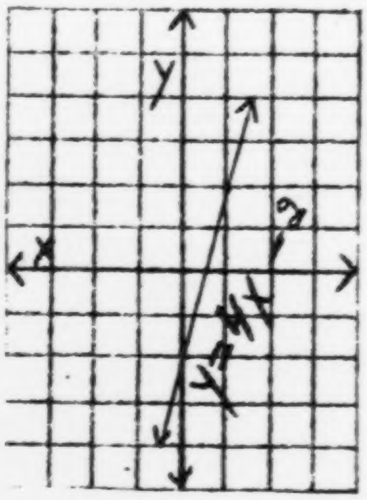
5. (74)



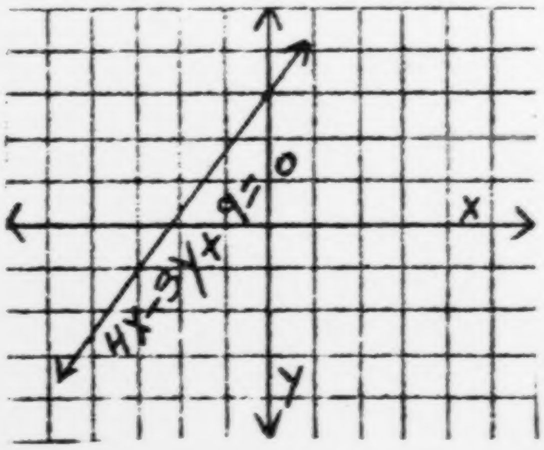
6. (74)



7. (74)



8. (74)

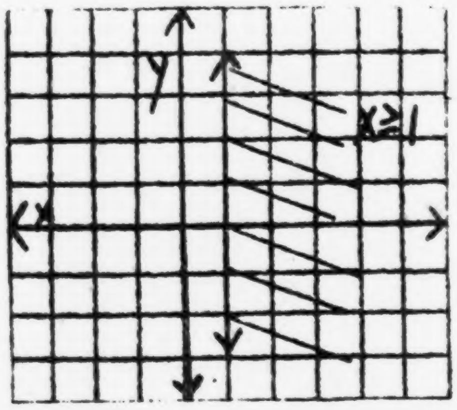


9. y = -3x - 5 (75)

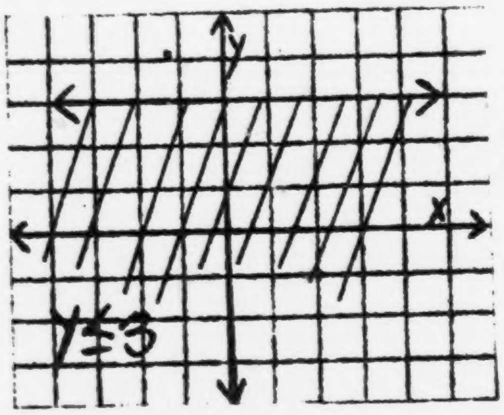
10. y = 5x - 19 (75)

11. 3y = -2x - 4 (75)

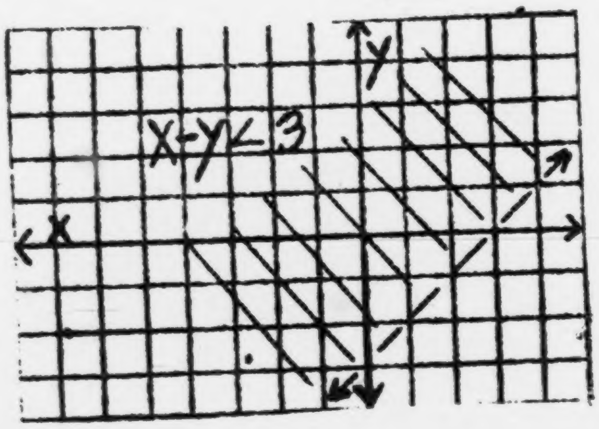
12. (76)



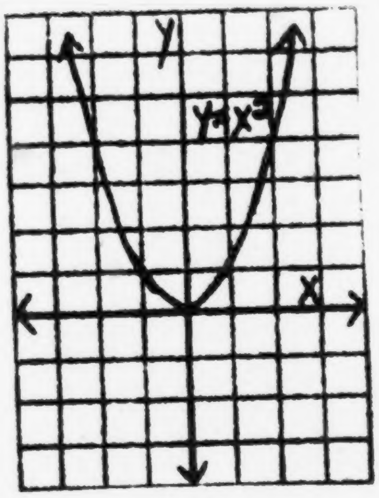
13. (76)



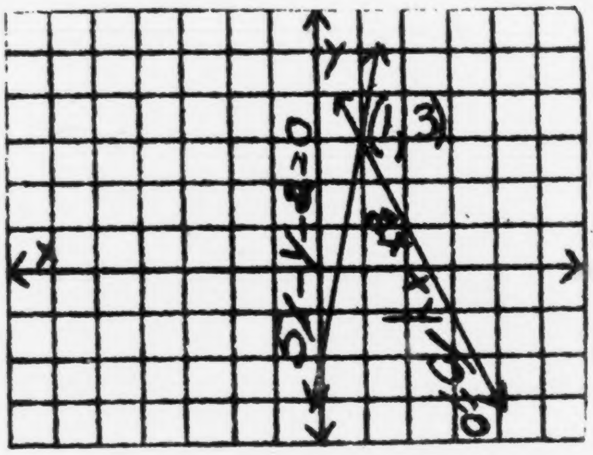
14. (76)



15. (76)



16. (77)


y
(1,3)
x
5x-y-2=0
3x+y-6=0

{(1,3)}

17.	{(2,5)}	(78,79,80)
18.	{(3,0)}	(78,79,80)
19.	11	(81)
20.	4	(81)
21.	x	(81)

Acceptable Score $\frac{23}{33}$

UNIT X

TEACHER'S ANSWER KEY

PART I
Test A

FIRST YEAR ALGEBRA

1.	G, H, I	(85)
2.	$\frac{4}{7}, \frac{3}{5}$	(82)
3.	$\frac{17}{144}$	(82)
4.	B, D	(83)
5.	$\frac{47}{99}$	(83)
6.	False	(83)
7.	Ratio	(82)
8.	$\frac{9}{20}$	(83)
9.	A	(33)
10.	False	(83)
11.	97	(84)
12.	Index	(84)
13.	B	
14.	5	(84)
15.	7d	(84)
16.	$\sqrt{21}$	(86)
17.	$35\sqrt{62}$	(86)
18.	$\sqrt{3}$	(86)
19.	10z	(84)
20.	$\sqrt{3}$	(86)
21.	7xy	(84)
22.	$2\sqrt{5}$	(86)
23.	$20\sqrt{6}$	(86)
24.	$\frac{\sqrt{5}}{3}$	(86)
25.	$\frac{\sqrt{14}}{7}$	(86)
26.	$\frac{2\sqrt{7}}{7}$	(86)
27.	$2A\sqrt{2}$	(86)
28.	25B	(86)
29.	$a\sqrt{7}$	(86)
30.	$\frac{\sqrt{42a}}{7}$	(86)
31.	7ab	(84)
32.	$\frac{x\sqrt{6}}{2}$	(86)
33.	$\frac{\sqrt{xy}}{y}$	(86)

Acceptable Score $\frac{23}{33}$

UNIT X

TEACHER'S ANSWER KEY

PART I
Test B

FIRST YEAR ALGEBRA

1.	A, B, C, D, E, I	(85)
2.	$\frac{3}{7}$, $\frac{4}{9}$	(82)
3.	$\frac{13}{84}$	(82)
4.	B, D	(83)
5.	$\frac{7}{9}$	(83)
6.	Ratio	(82)
7.	$\frac{67}{100}$	(83)
8.	True	(83)
9.	D	(33)
10.	False	(83)
11.	57	(84)
12.	7	(84)
13.	A	
14.	7	(84)
15.	6d	(84)
16.	$\sqrt{35}$	(86)
17.	$6\sqrt{62}$	(86)
18.	$\sqrt{5}$	(86)
19.	12a	(84)
20.	$\sqrt{3}$	(86)
21.	8ax	(84)
22.	$3\sqrt{2}$	(86)
23.	$16\sqrt{3}$	(86)
24.	$\frac{\sqrt{7}}{5}$	(86)
25.	$\frac{\sqrt{15}}{5}$	(86)
26.	$\frac{3\sqrt{5}}{5}$	(86)
27.	$2B\sqrt{2}$	(86)
28.	9y	(86)
29.	$b\sqrt{5}$	(86)
30.	$\frac{\sqrt{15a}}{3}$	(86)
31.	5xy	(84)
32.	$\frac{a\sqrt{21}}{3}$	(86)
33.	$\frac{\sqrt{xy}}{x}$	(86)

Acceptable Score $\frac{23}{33}$

UNIT X

TEACHER'S ANSWER KEY

PART I
Test C

FIRST YEAR ALGEBRA

1.	F, G, H	(85)
2.	$\frac{2}{7}$, $\frac{3}{8}$	(82)
3.	$\frac{9}{40}$	(83)
4.	A, C	(83)
5.	$\frac{5}{11}$	(83)
6.	$\frac{13}{20}$	(83)
7.	Ratio	(82)
8.	False	(83)
9.	B	(33)
10.	False	(84)
11.	73	(84)
12.	8	(84)
13.	c	
14.	3	(84)
15.	7x	(84)
16.	$\sqrt{15}$	(86)
17.	$8\sqrt{30}$	(86)
18.	$\sqrt{5}$	(86)
19.	9a	(84)
20.	$\sqrt{3}$	(86)
21.	7yz	(84)
22.	$2\sqrt{3}$	(86)
23.	$6\sqrt{6}$	(86)
24.	$\frac{\sqrt{13}}{6}$	(86)
25.	$\frac{\sqrt{6}}{3}$	(86)
26.	$\frac{2\sqrt{3}}{3}$	(86)
27.	$2c\sqrt{3}$	(86)
28.	16y	(86)
29.	$a\sqrt{11}$	(86)
30.	$\frac{\sqrt{14a}}{2}$	(86)
31.	7ab	(84)
32.	$\frac{a\sqrt{15}}{3}$	(86)
33.	$\frac{\sqrt{ab}}{b}$	(86)

Acceptable Score $\frac{23}{33}$

UNIT X

TEACHER'S ANSWER KEY

PART I
Test D

FIRST YEAR ALGEBRA

1.	A, B, C, D, E, I	(85)
2.	$\frac{2}{3}$, $\frac{3}{5}$	(82)
3.	$\frac{13}{84}$	(82)
4.	B, C	(83)
5.	$\frac{5}{9}$	(83)
6.	$\frac{37}{100}$	(83)
7.	Ratio	(82)
8.	True	(83)
9.	C	(33)
10.	False	(83)
11.	Radicand	(84)
12.	52	(84)
13.	A	
14.	5	(84)
15.	3a	(84)
16.	$\sqrt{10}$	(86)
17.	$21\sqrt{21}$	(86)
18.	$\sqrt{2}$	
19.	8a	(84)
20.	$\sqrt{3}$	(86)
21.	9ab	(84)
22.	$3\sqrt{5}$	(86)
23.	$12\sqrt{10}$	(86)
24.	$\frac{\sqrt{21}}{7}$	(86)
25.	$\frac{3\sqrt{7}}{7}$	(86)
26.	$\frac{\sqrt{17}}{9}$	(86)
27.	$3B\sqrt{5}$	(86)
28.	9a	(86)
29.	$a\sqrt{13}$	(86)
30.	$\frac{\sqrt{33a}}{11}$	(86)
31.	11ab	(84)
32.	$\frac{a\sqrt{91}}{13}$	(86)
33.	$\frac{\sqrt{ab}}{a}$	(86)

Acceptable Score $\frac{16}{22}$

UNIT X

TEACHER'S ANSWER KEY

PART II
Test A

FIRST YEAR ALGEBRA

1.	B, D	(87)
2.	$7\sqrt{2}$	(87)
3.	$-4\sqrt{11}$	(87)
4.	$11\sqrt{3} - 2\sqrt{5}$	(87)
5.	$11\sqrt{2}$	(87)
6.	$\sqrt{3}$	(87)
7.	-2	(88)
8.	$11 - 5\sqrt{3}$	(88)
9.	$3 + \sqrt{13}$	(89)
10.	$\sqrt{7} - \sqrt{5}$	(89)
11.	$-5(1 - \sqrt{2})$	(89)
12.	$-3(\sqrt{3} - \sqrt{5})$	(89)
13.	$-12a\sqrt{b}$	(86)
14.	$a\sqrt{15b}$	(86)
15.	$2a\sqrt{6}$	(86)
16.	$\frac{a\sqrt{15}}{3}$	(86)
17.	$\frac{\sqrt{14a}}{2a}$	(86)
18.	$\frac{y\sqrt{3x}}{x}$	(86)
19.	$\frac{2\sqrt{xz}}{z}$	(86)
20.	$\{25\}$	(90)
21.	$\{4\}$	(90)
22.	ϕ	(90)

Acceptable Score $\frac{16}{22}$

UNIT X

TEACHER'S ANSWER KEY

PART II
Test B

FIRST YEAR ALGEBRA

1.	A, D	(87)
2.	$4\sqrt{5}$	(87)
3.	$-3\sqrt{3}$	(87)
4.	$7\sqrt{7} + 10\sqrt{2}$	(87)
5.	$6\sqrt{2}$	(87)
6.	$29\sqrt{2}$	(87)
7.	-5	(88)
8.	$12 - 9\sqrt{2}$	(88)
9.	$9 - \sqrt{10}$	(89)
10.	$\sqrt{3} + \sqrt{5}$	(89)
11.	$3(\sqrt{3} + 1)$	(89)
12.	$\frac{3(\sqrt{2} + \sqrt{7})}{-5}$	(89)
13.	$-15c\sqrt{d}$	(86)
14.	$m\sqrt{21n}$	(86)
15.	$2x$	(86)
16.	$\frac{R\sqrt{14}}{2}$	(86)
17.	$\frac{\sqrt{5t}}{2t}$	(86)
18.	$\frac{a}{b}\sqrt{2b}$	(86)
19.	$\frac{3\sqrt{gh}}{h}$	(86)
20.	$\{49\}$	(90)
21.	$\{19\}$	(90)
22.	ϕ	(90)

Acceptable Score $\frac{16}{22}$

UNIT X

TEACHER'S ANSWER KEY

PART II
Test C

FIRST YEAR ALGEBRA

1.	A, C	(87)
2.	$3\sqrt{6}$	(87)
3.	$-2\sqrt{7}$	(87)
4.	$3\sqrt{6} - 3\sqrt{2}$	(87)
5.	$12\sqrt{3}$	(87)
6.	$29\sqrt{5}$	(87)
7.	4	(88)
8.	$22 + 10\sqrt{5}$	(88)
9.	$\sqrt{11} + 4$	(89)
10.	$\sqrt{2} - \sqrt{3}$	(89)
11.	$\frac{4 + \sqrt{2}}{7}$	(89)
12.	$-(\sqrt{2} + \sqrt{5})$	(89)
13.	$-12x\sqrt{y}$	(86)
14.	$m\sqrt{6n}$	(86)
15.	$2R\sqrt{3}$	(86)
16.	$\frac{x\sqrt{14}}{2}$	(86)
17.	$\frac{\sqrt{15m}}{3m}$	(86)
18.	$\frac{m\sqrt{2n}}{n}$	(86)
19.	$\frac{3\sqrt{xy}}{x}$	(86)
20.	$\{9\}$	(90)
21.	$\{58\}$	(90)
22.	ϕ	(90)

Acceptable Score $\frac{16}{22}$

UNIT X

TEACHER'S ANSWER KEY

PART II
Test D

FIRST YEAR ALGEBRA

1.	D, E	(87)
2.	$-4\sqrt{11}$	(87)
3.	$6\sqrt{2}$	(87)
4.	$-4\sqrt{7} + 3\sqrt{3}$	(87)
5.	$-2\sqrt{5}$	(87)
6.	$45\sqrt{5}$	(87)
7.	-5	(88)
8.	$16 - 7\sqrt{5}$	(88)
9.	$\sqrt{7} - 5$	(89)
10.	$\sqrt{2} + \sqrt{11}$	(89)
11.	$-2(\sqrt{3} + 2)$	(89)
12.	$\frac{7(\sqrt{11} + \sqrt{2})}{9}$	(89)
13.	$-12m\sqrt{n}$	(86)
14.	$y\sqrt{14x}$	(86)
15.	$a\sqrt{6}$	(86)
16.	$\frac{c\sqrt{21}}{3}$	(86)
17.	$\frac{\sqrt{15x}}{3x}$	(86)
18.	$\frac{\sqrt{5a}}{b}$	(86)
19.	$\frac{5\sqrt{ab}}{b}$	(86)
20.	$\{100\}$	(90)
21.	$\{7\}$	(90)
22.	ϕ	(90)

Acceptable Score $\frac{19}{27}$

UNIT XI TEACHER'S ANSWER KEY Test A

FIRST YEAR ALGEBRA

1.	Function	(92)
2.	{1, 2, 3, 4}	(91)
3.	{0, 1, 2}	(91)
4.	B	(91)
5.	A	(91)
6.	False	(92)
7.	D	(92)
8.	C	(92)
9.	False	(92)
10.	{-1, 3, 7}	(92)
11.	{1, 2, 3}	(92)
12.	$y = 3x$	(93)
13.	3	(93)
14.	$\frac{36}{5}$	(93)
15.	$\frac{45}{4}$	(93)
16.	D	(93)
17.	C	(93)
18.	A	(93)
19.	B	(93)
20.	180	(93)
21.	{-4, 4}	(93)
22.	B	(94)
23.	C	(93)
24.	A	(93)
25.	14	(94)
26.	False	(93)
27.	-1	(94)

Acceptable Score $\frac{19}{27}$

UNIT XI

TEACHER'S ANSWER KEY

Test B

FIRST YEAR ALGEBRA

1.	First	(92)
2.	$\{1, 2, 3, 4\}$	(91)
3.	$\{0, 1, 4\}$	(91)
4.	C	(91)
5.	C	(91)
6.	False	(92)
7.	C	(92)
8.	D	(92)
9.	False	(92)
10.	$\{-1, 3, 7\}$	(92)
11.	$\{1, 2, 3\}$	(92)
12.	$y = 4x$	(93)
13.	4	(93)
14.	$\frac{36}{7}$	(93)
15.	$\frac{27}{2}$	(93)
16.	C	(93)
17.	B	(93)
18.	D	(93)
19.	A	(93)
20.	144	(93)
21.	$a = \pm 4$	(93)
22.	D	(94)
23.	A	(93)
24.	B	(93)
25.	20	(94)
26.	True	(93)
27.	-9	(94)

Acceptable Score $\frac{19}{27}$

UNIT XI

TEACHER'S ANSWER KEY

Test C

FIRST YEAR ALGEBRA

1.	Function	(92)
2.	$\{0, 1, 2, 3\}$	(91)
3.	$\{0, 1, 2\}$	(91)
4.	A, B	(91)
5.	D	(91)
6.	True	(92)
7.	C	(92)
8.	D	(92)
9.	False	(92)
10.	$\{1, 7, 13\}$	(92)
11.	$\{1, 2, 3\}$	(92)
12.	$y = \frac{1}{2}x$	(93)
13.	$\frac{1}{2}$	(93)
14.	10	(93)
15.	$\frac{35}{4}$	(93)
16.	B	(93)
17.	A	(93)
18.	D	(93)
19.	C	(93)
20.	$\frac{1200}{7}$	(93)
21.	± 4	(93)
22.	C	(94)
23.	B	(93)
24.	D	(93)
25.	21	(94)
26.	False	(93)
27.	-1	(94)

Acceptable Score $\frac{19}{27}$

UNIT XI

TEACHER'S ANSWER KEY

Test D

FIRST YEAR ALGEBRA

1.	First	(92)
2.	$\{-2, 0, 1, 5\}$	(91)
3.	$\{16, 4, 1, 9\}$	(91)
4.	A, C	(91)
5.	B	(91)
6.	True	(92)
7.	D	(92)
8.	B	(92)
9.	True	(92)
10.	$\{-5, -2, 1\}$	(92)
11.	$\{-2, 0, 2\}$	(92)
12.	$y = -2x$	(93)
13.	-2	(93)
14.	$\frac{24}{5}$	(93)
15.	$\frac{25}{2}$	(93)
16.	D	(93)
17.	A	(93)
18.	C	(93)
19.	B	(93)
20.	6	(93)
21.	$\{\pm 4\}$	(93)
22.	B	(94)
23.	A	(93)
24.	C	(93)
25.	6	(94)
26.	True	(93)
27.	3	(94)

APPENDIX D

PROFILE SHEET

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

STUDENT PROFILE SHEET

Name of Student: ______________________________ H. R. ______________

Subject: ______________________________ Pd. ______________

SCAT Scores: ______________________________

Quarter Grades:

I	II	H	III	IV	H	Y

Test No.	Date	Acceptable Score	Student Score	Comments	Dates of Absence

Name of Student: ____

Test No.	Date	Acceptable Score	Student Score	Comments	Dates of Absence

Anecdotal Record:

APPENDIX E

EVALUATION SHEET

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

REACTIONS PLEASE

This program will only be as good as you make it. Your suggestions and criticisms are earnestly sought so that they can be included in revisions of the program.

VOLUME I

Page Number (if appropriate)	Comment

Send to: Thomas E. Rowan
Supervisor of Mathematics
Maryland State Department of Education
600 Wyndhurst Avenue
Baltimore, Maryland 21210